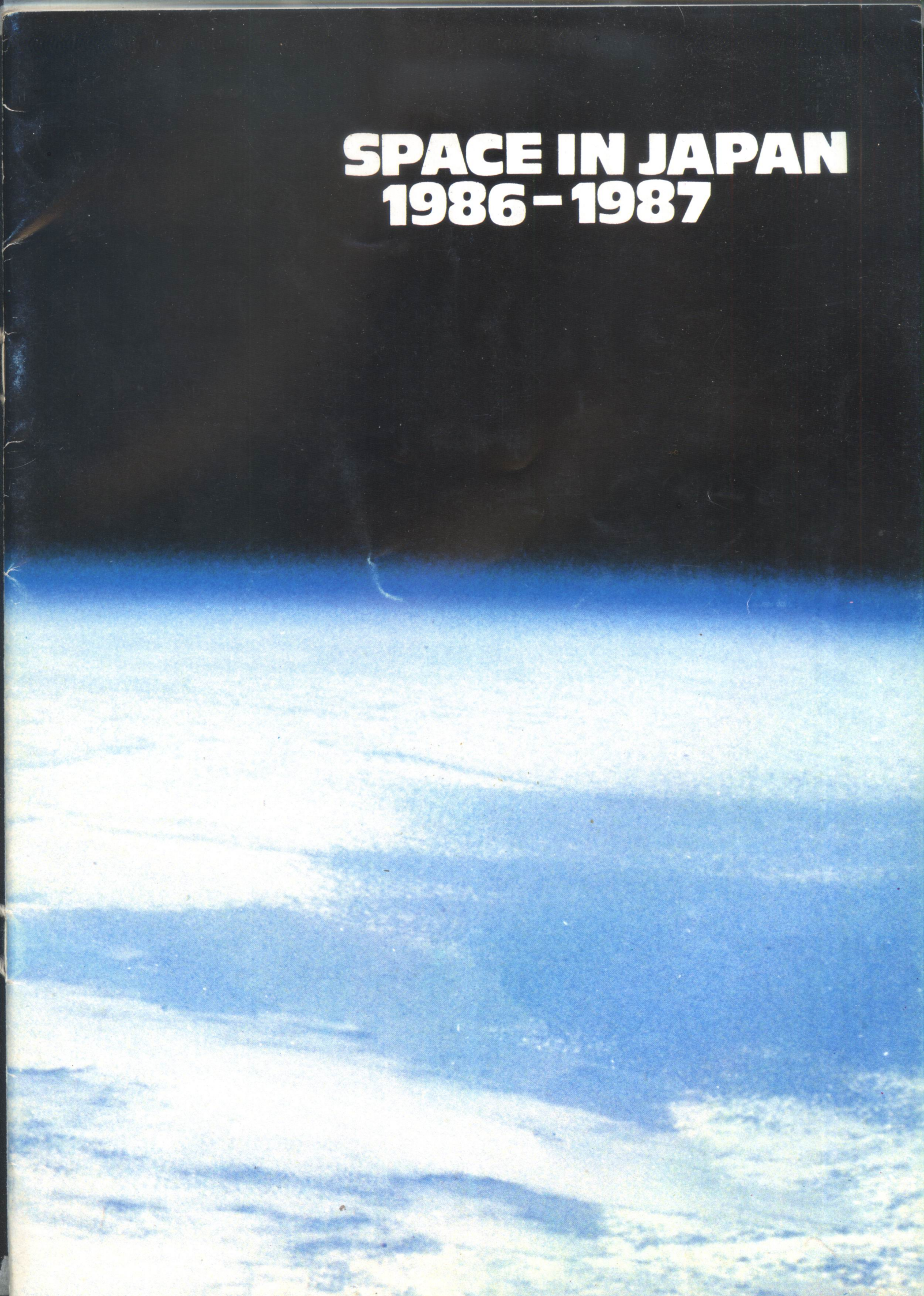


SPACE IN JAPAN 1986-1987





The Doctor

<http://thedoctorwho1967.blogspot.com.ar/>

<http://el1900.blogspot.com.ar/>

<http://librosrevistasinteresesanexo.blogspot.com.ar/>

SPACE IN JAPAN
1986-1987

Published by

KEIDANREN
(Federation of Economic Organizations)
1-9-4, Otemachi, Chiyoda-ku, Tokyo, Japan

Prepared under the editorial supervision of

RESEARCH COORDINATION BUREAU,
SCIENCE AND TECHNOLOGY AGENCY
2-2-1, Kasumigaseki, Chiyoda-ku, Tokyo, Japan

Printed in Japan



The National Space Development Agency of Japan (NASDA) launched Broadcasting Satellite-2b "YURI-2b" from its Tanegashima Space Center on Feb. 12, 1986, using the N-II-7 launch vehicle.



The Institute of Space and Astroautical Science (ISAS) launched, by means of the M-3SII-2 launch vehicle, the Tenth Scientific Satellite (PLANET-A) "SUISEI" from the Kagoshima Space Center on Aug. 19, 1985.

SPACE IN JAPAN

1986-87

CONTENTS

1. National Organization for Space Activities	2
2. Budget for Space Activities	5
3. Brief History of Space Activities	6
4. Utilization of Space	8
5. Space Activities in Japan	12
(1) Table of Satellites	12
(2) Development of Satellites	16
(3) Development of Launch Vehicles	18
6. International Cooperation	20
7. Industry's Role in Space Activities	21

1. National Organizations for Space Activities

Space development in Japan is executed in a comprehensive and systematic way under the leadership of the Space Activities Commission (SAC), the advisory organ to the Prime Minister.

SAC consists of the chairman (the Minister of State for Science and Technology) and four commissioners. The main task of SAC is to deliberate and to decide on important matters related to space development. SAC is authorized to submit its opinions to the Prime Minister. SAC formulated the "Outline of Japan's Space Development Policy" in March 1978, which set forth the guiding principles of Japan's space activities for the next 15 years. Also, SAC decided on a "Space Development Program" to supplement the "Outline of Japan's Space Development Policy" which it reviews every year.

The Prime Minister, based on SAC's advice, decides the government's basic space development program and in accordance with that the related administrative organs conduct research and development.

The central body of space development is the National Space Development Agency of Japan (NASDA). NASDA takes charge of and undertakes the development of satellites and launch vehicles in the fields of application and the launching and tracking of satellites.

As for the space program in the fields of space science, the Institute of Space and Astronautical Science (ISAS) of the Ministry of Education undertakes research and development of scientific satellites and their launch vehicles, and also performs the launch.

(a) Space Activities Commission (SAC)

Space Activities Commission (SAC) was established in May 1968 by Law for the Establishment of SAC, in order to centralize the space activities of the various government agencies and to have them executed under a systematic program. The role of SAC is to plan, deliberate and decide important matters on space activities, and every year SAC reviews the Space Development Program, estimates the space-related expenses and so on. The secretariat function of SAC is conducted by the Research Coordination Bureau of the Science and Technology Agency in cooperation with other ministries and administrative agencies.

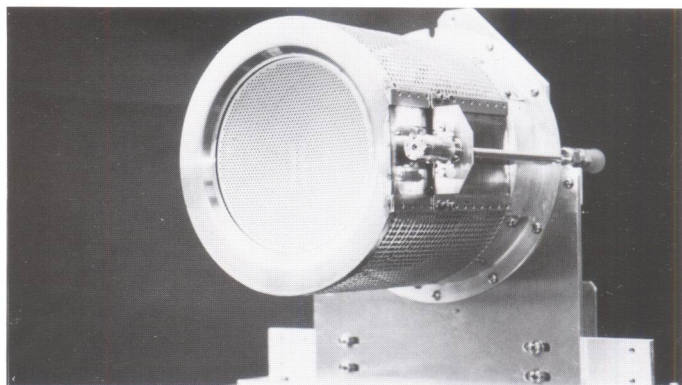
(b) Science and Technology Agency (STA)

In addition to being a secretariat of SAC, the Research Coordination Bureau (RCB) is responsible for planning basic policies on science and technology concerning space development, international cooperation in space utilization, and the promotion of space utilization and supervision of NASDA.



Kashima Branch,
RCB

The National Aerospace Laboratory (NAL), a research organization attached to STA, carries out research on basic space technology.



NAL (12cm cusp xenon ion thruster)

(c) Ministry of Education (MOE)

The Institute of Space and Astronautical Science (ISAS) is a national inter-university research institute which belongs to the Ministry of Education. ISAS is responsible both for research in space science conducted by means of balloons, sounding rockets and scientific satellites and for the development of balloons, sounding rockets, the M (Mu)-family launch vehicles and scientific satellites. It is also responsible for launching and collecting data from these space vehicles.

To promote space science and technology, ISAS coordinates space-science research in Japan and provides for further advanced education of space and astronautical scientists and engineers. In addition to these domestic space research activities, ISAS has been engaged in international cooperation programs.

*ISAS was reorganized as an independent national institute in April 1981, taking over the activities of the Institute of Space and Aeronautical Science of the University of Tokyo.



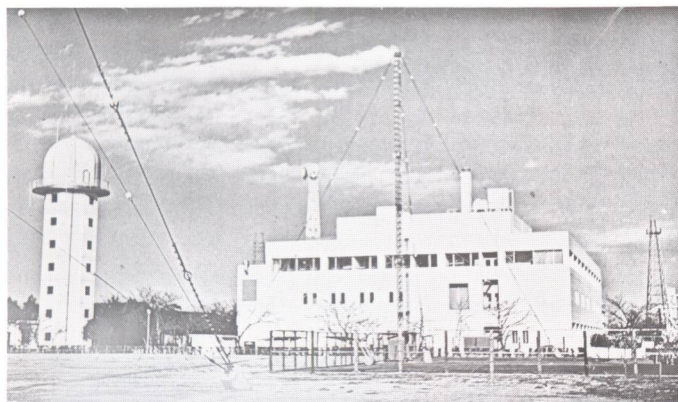
Kagoshima Space Center, ISAS

(d) Ministry of Transport (MOT)

The Japan Meteorological Agency (JMA) is responsible for meteorological services using geostationary and orbital satellites and for observations using meteorological rockets. The Meteorological Satellite Center, attached to JMA, is responsible for the controls and operation of satellites, image data acquisition and meteorological data analysis.

The Electronic Navigation Research Institute (ENRI), a research organization attached to MOT, carries out research on satellite navigation.

MOT also supervises NASDA.



Meteorological Satellite Center, JMA

(e) Ministry of Posts and Telecommunications (MPT)

The Communications Policy Bureau (CPB) is responsible for planning and promoting policies on satellite-communications and satellite-broadcasting systems as well as radio regulations on the utilization, development and research of space.

It also supervises NASDA and the Telecommunications Satellite Corporation of Japan.

The Telecommunications Bureau (TB) supervises the Nippon Telegraph and Telephone Corporation (NTT), and the Kokusai Denshin Denwa Company Limited (KDD), which is the signatory to the INTELSAT and INMARSAT Operating Agreements.

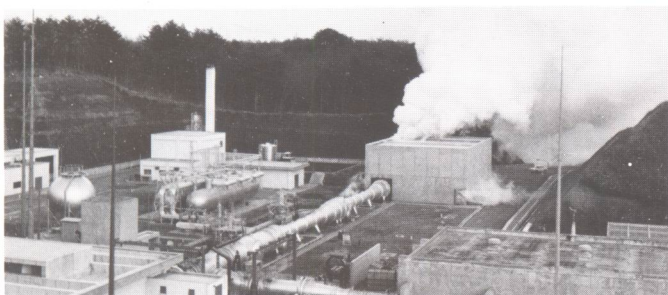
The Radio Research Laboratories (RRL), MPT's research arm, carries out research on radio wave propagation, space communications, sensors for remote sensing of the earth's environment and so on.

(f) Other Government Agencies

The National Police Agency (NPA), the Environment Agency (EA), the Ministry of Foreign Affairs (MOF), the Ministry of Agriculture, Forestry and Fisheries (MAFF), the Ministry of International Trade and Industry (MITI), the Ministry of Construction (MOC) and the Ministry of Home Affairs (MHA) are also involved in Japan's space activities.

(g) National Space Development Agency of Japan (NASDA)

National Space Development Agency of Japan (NASDA)



Kakuda Branch, NAL

was established in 1969 under the NASDA Law in order to promote Japan's space development in practical applications designed solely for peaceful purposes.

The agency's main tasks are:

- 1) research and development of satellites and their launch vehicles excluding those for scientific purpose (such as communications, broadcasting and earth observation)
- 2) launching of satellites including tracking and control
- 3) receiving and processing of satellite data needed for remote sensing activities
- 4) promotion of material processing experiments in space

The funds necessary for NASDA activities are covered primarily by its capital and government subsidies. It also may obtain in investments from non-governmental organizations.



Tanagashima Space Center, NASDA

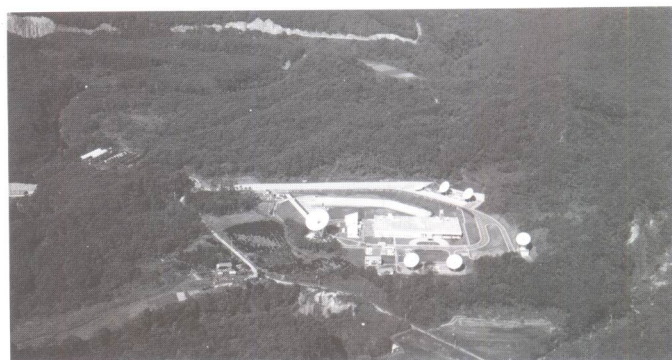
(h) Telecommunications Satellite Corporation of Japan (TSCJ)

TSCJ was established in August 1979 in order to operate and control operational communications and broadcasting satellites in an integrated and efficient manner.

The corporation's main tasks are:

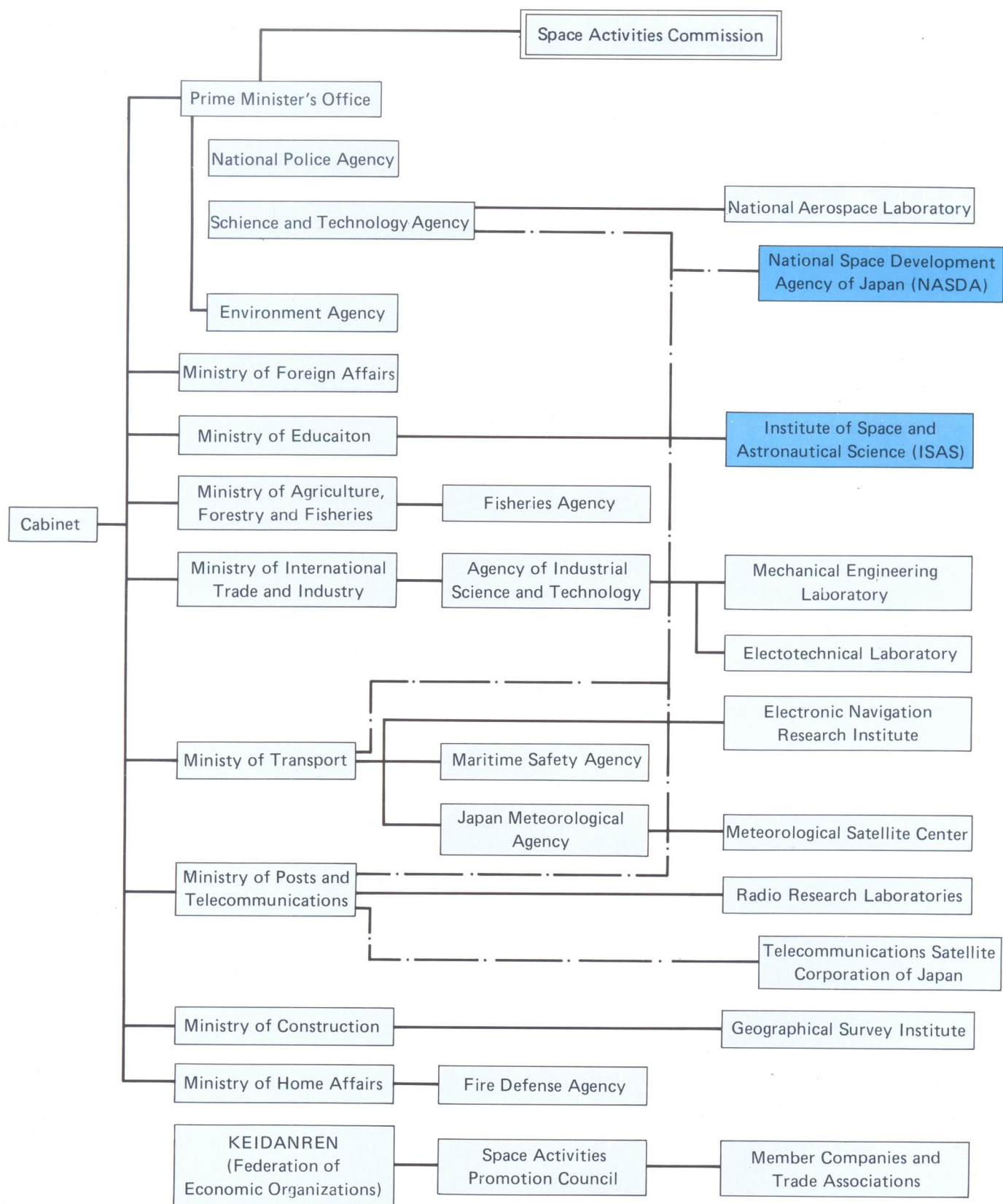
- 1) To have communications and broadcasting satellites launched by other agencies
- 2) To control position, attitude, etc. of communications and broadcasting satellites
- 3) To furnish radio equipment on board communications and broadcasting satellites to those who establish radio stations using the radio equipment

TSCJ commenced TT&C operations in May 1983 as Japan's first operational communication satellite (CS-2a), in November 1983 as the back-up satellite (CS-2b) and in April 1984 as the first operational direct-broadcasting satellite (BS-2a), respectively.



Kimitsu Satellites Control Center, TSCJ

■ Schematic Chart of National Organization for Space Activities



■ The Outline of Japan's Space Development Policy

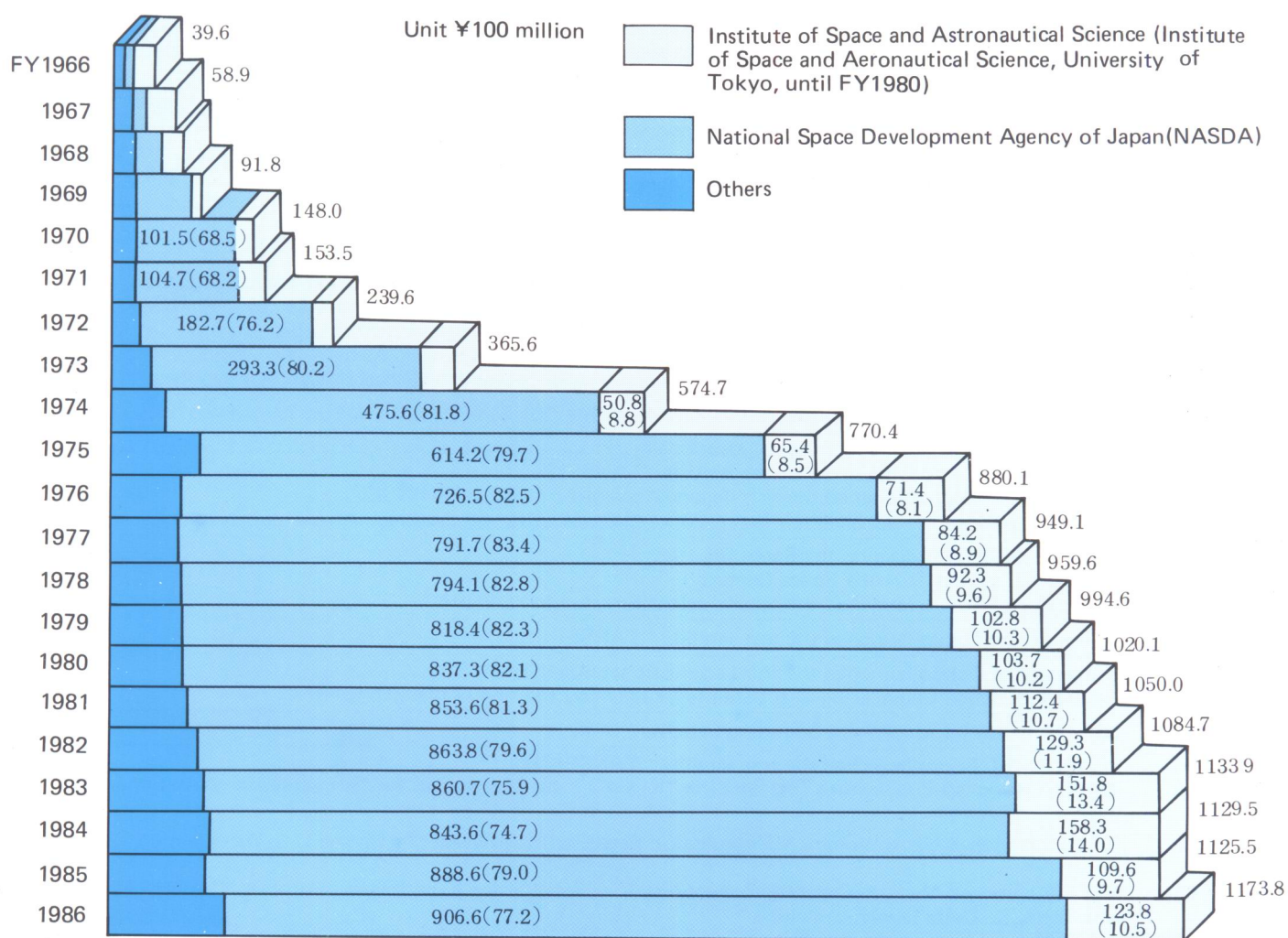
As a guideline of Japan's space activities, the Outline of Japan's Space Development Policy was formulated by the Space Activities Commission (SAC) in 1978. In order to respond more effectively to the changing situation of the world space development activities, in 1984 SAC revised some of the Outline.

The revised Outline stipulates (1) necessity of harmonizing social needs with national welfare, (2) ensuring Japan's autonomous space activities with indigenous technologies and (3) space activities through international cooperation. In ac-

cordance with these three principles Japan's, space activities have been up to now conducted.

For the next fifteen years, Japan will engage in multifaceted activities, when necessity arises, such as material science, interplanetary exploration and so forth aboard the U.S. space shuttle in addition to the conventional activities in the field of science, communications, meteorology, etc. Japan also intends to vigorously participate in the U.S. Space Station Program.

2. Budget for Space Activities



- Notes:
1. The upper figure in each fiscal year shows the total budget for space activities.
 2. Figures in parenthesis indicate percentage (%) as against the total budget for each fiscal year.
 3. Japan's Fiscal Year: April 1 – March 31.

3. Brief History of Space Activities

1955	Apr.	The budget for the development of sounding rockets was appropriated for the first time to the Institute of Industrial Science, University of Tokyo.
	Aug. 6	The launch test of the Pencil rocket was conducted.
1956	May 19	The Science and Technology Agency (STA) was established.
1957	Oct. 4	The Soviet Union launched the world's first satellite "SPUTNIK-1".
1958	Jan. 31	The U.S. launched her first satellite "EXPLORER-1".
	Oct. 1	The U.S. set up the National Aeronautics and Space Administration (NASA).
1960	May 16	The National Space Activities Council (NSAC) was established in the Prime Minister's Office.
1961	Apr. 12	The Soviet Union launched the world's first manned spaceship "VOSTOK-1".
	Dec.	University of Tokyo opened a testing ground at Noshiro, Akita Prefecture.
1962	Feb. 20	The U.S. launched her first manned spaceship "FRIENDSHIP-7" (Project Mercury).
	Oct. 15	The Radio Research Laboratories, Ministry of Posts and Telecommunications, completed a 30-m parabolic antenna for space communications tests at Kashima, Ibaraki Prefecture.
1963	Apr.	University of Tokyo started research and development of the M (Mu) launch vehicle.
	Nov. 23	Japan-U.S. TV transmission was conducted for the first time via satellite "RELAY-1" of the U.S.
	Dec. 9	University of Tokyo opened the Kagoshima Space Center.
1964	Apr. 1	The Institute of Space and Aeronautical Science, University of Tokyo, was established.
	July 1	The National Space Development Center (NSDC) was organized within STA.
	July 11	University of Tokyo launched the L (Lamda)-3 rocket to an altitude of 850 km.
	Aug. 20	The international agreements for interim arrangements for INTELSAT entered into force.
	Oct. 10	The Tokyo Olympic Games were televised throughout the world via the U.S. communications satellite "SYNCOM-3".
1965	June 20	University of Tokyo announced a plan for scientific satellites.
	Nov. 26	France launched her first satellite "A-1" by the Diamant launch vehicle.
1967	Oct. 10	"Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies" entered into force.
1968	Aug. 16	The Space Activities Commission (SAC) was established to replace NSAC.
1969	Feb. 6	STA conducted a flight test of the LS-C-1 rocket.
	July 16	The U.S. launched the world's first manned lunar landing spaceship "APOLLO-11" (successfully soft-landed on the moon's surface on July 20).
	July 31	The 1969 U.S.-Japan space agreement was concluded.
	Sept.	STA conducted a flight test of the solid-fuel rocket JCR-1.
	Oct. 1	The National Space Development Agency of Japan (NASDA) was established (NSDC was dissolved).
1970	Feb. 11	University of Tokyo launched the first Japanese satellite "OHSUMI" by the L-4S-5 launch vehicle.
	Apr. 24	China launched her first satellite.
1971	Feb. 16	University of Tokyo launched the test satellite "TANSEI".
	Sept. 28	University of Tokyo launched the first Japanese scientific satellite "SHINSEI".
	Oct. 28	The United Kingdom launched her first satellite "PROSPERO" by the Black Arrow launch vehicle.
1972	Jan. 5	The U.S. decided to develop the Space Shuttle.
	June 1	NASDA set up the Tsukuba Space Center.
	Aug. 19	University of Tokyo launched the second scientific satellite "DENPA".
1974	Feb. 16	University of Tokyo launched the test satellite "TANSEI-II".
1975	Feb. 24	University of Tokyo launched the third scientific satellite "TAIYO".
	Sept. 9	NASDA launched Engineering Test Satellite "KIKU" by the first N-I launch vehicle.
1976	Feb. 29	NASDA launched Ionosphere Sounding Satellite "UME".
1977	Feb. 19	University of Tokyo launched the test satellite "TANSEI-III".
	Feb. 23	NASDA launched Engineering Test Satellite "KIKU-2" was launched as the first Japanese geostationary satellite.
	July 14	NASDA launched Geostationary Meteorological Satellite "HIMAWARI" with the U.S. Delta launch vehicle.
	Dec. 15	NASDA launched Medium-Capacity Communications Satellite for Experimental Purposes "SAKURA" with the U.S. Delta launch vehicle.
1978	Feb. 4	University of Tokyo launched the fifth scientific satellite "KYOKKO".
	Feb. 16	NASDA launched Ionosphere Sounding Satellite "UME-2".
	Mar. 17	SAC decided "Outline of Japan's Space Development Policy".
	Apr. 8	NASDA launched Medium-Scale Broadcasting Satellite for Experimental Purposes "YURI" with the U.S. Delta launch vehicle.
	Sept. 16	University of Tokyo launched the sixth scientific satellite "JIKIKEN".
1979	Jan. 29	NASDA concluded Memorandum of Understanding with NASA concerning direct reception of data from Landsat satellites.

1979	Feb. 6	NASDA launched Experimental Communications Satellite "AYAME" (Planned geostationary orbit not achieved).
	Feb. 21	University of Tokyo launched the fourth scientific satellite "HAKUCHO".
	July 16	INMARSAT came into existence.
	July 25	Japan and the U.S. agreed to implement joint projects recommended by the NASA/SAC Study Group.
	Aug. 13	The Telecommunications Satellite Corporation of Japan was established.
	Dec. 24	The European Space Agency (ESA) launched "ARIANE-VI" satellite by the first Ariane launch vehicle.
1980	Feb. 17	University of Tokyo launched the test satellite "TANSEI-IV".
	Feb. 22	NASDA launched Experimental Communications Satellite "AYAME-2" (Planned geostationary orbit not achieved).
	July 18	India launched her first satellite "ROHINI" by the SLV-3 launch vehicle.
	Sept. 15-20	The U.N. Seminar on Remote Sensing Applications to Land-Use Planning was held in Tokyo.
	Sept. 21-28	International Astronautical Federation (IAF) held the 31st Congress in Tokyo.
1981	Feb. 11	NASDA launched Engineering Test Satellite-IV "KIKU-3" by the first N-II launch vehicle.
	Feb. 21	University of Tokyo launched the seventh scientific satellite "HINOTORI".
	Apr. 12	The U.S. launched the First Space Shuttle (successfully returned from its mission on Apr. 14).
	Apr. 14	The Institute of Space and Astronautical Science (ISAS) was inaugurated (through reorganization of the Institute of Space and Aeronautical Science, University of Tokyo).
	Aug. 11	NASDA launched Geostationary Meteorological Satellite-2 "HIMAWARI-2".
1982	Aug. 9-21	Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82) was held.
	Sept. 3	NASDA launched Engineering Test Satellite-III "KIKU-4".
1983	Feb. 4	NASDA launched Communications Satellite-2a "SAKURA-2a".
	Feb. 20	ISAS launched the eighth scientific Satellite "TENMA".
	June 20	"Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space", "Convention on International Liability for Damage Caused by Space Object", and "Convention on Registration of Object Launched into Outer Space", entered into force.
	Aug. 6	NASDA launched Communications Satellite-2b "SAKURA-2b".
1984	Jan. 23	NASDA launched Broadcasting Satellite-2a "YURI-2a".
	Feb. 14	ISAS launched the ninth Scientific Satellite "OHZORA".
	Feb. 23	SAC revised the Outline of Japan's Space Development Policy".
	Aug. 3	NASDA launched Geostationary Meteorological Satellite-3 "HIMAWARI-3".
1985	Jan. 8	ISAS launched the first Planet Vehicle "SAKIGAKE" by the first M-3SII launch vehicle.
	May 9	"Memorandum of Understanding between the United States National Aeronautics and Space Administration and Science and Technology Agency of Japan for the Cooperative Program Concerning Detailed Definition and Preliminary Design Activities of a Permanently Manned Space Station" was concluded.
	Aug. 19	ISAS launched the tenth Scientific Satellite "SUISEI".
1986	Feb. 12	NASDA launched Broadcasting Satellite-2b "YURI-2b".

4. Utilization of Space

(1) Communications

Satellite communications play an important role in our daily lives such as in television broadcasting and telephone transmission. Japan launched its first domestic communications satellite "SAKURA" in December 1977. In February and August 1983, Japan also launched applications satellites "SAKURA-2a and -2b" (CS-2a and CS-2b) to be used for communications in an emergency and between the main land and remote islands.

Furthermore, two Communications Satellite-3 (CS-3a and CS-3b) are expected to be launched in 1988 respectively in response to increasing and diversifying communications needs.

These satellites, which will be developed and launched by NASDA and then operated by the Telecommunications Satellite Corporation of Japan, are used by NTT and other public organizations.



CS-2 Portable Earth Station

This is a portable earth station developed by NTT. The antenna and processing systems have been reduced in both size and weight, enabling it to be mounted in a vehicle for mobile operation. It has been designed to provide circuit relief, that is to ensure rapid restoration of communications, during emergencies such as natural disasters.



Artist's concept of
Communication's Satellite-3
(CS-3a, CS-3b)

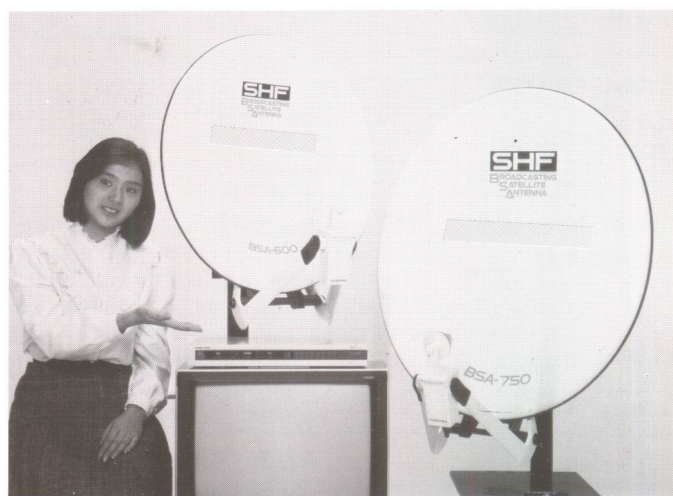
(2) Broadcasting

A broadcasting satellite permits individual reception in ordinary homes using simple antenna. It solves the problems such as poor TV reception especially in mountainous areas due to topographical features, and disturbed reception due to tall buildings in cities.

The first broadcasting satellite "YURI" for experimental use was launched in April 1978. In January 1984 and February 1986, Japan launched broadcasting satellites "YURI-2a and 2b" (BS-2a, 2b) for use in the nation-wide broadcast services.

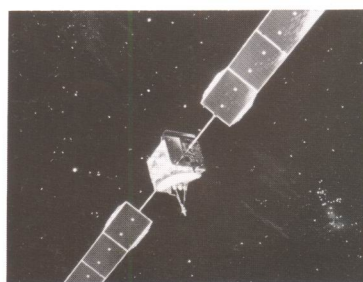
Furthermore, two Broadcasting Satellite-3 (BS-3a and BS-3b) are scheduled for launch in respectively 1990 and 1991 in order to meet the increasing and diversifying needs in broadcasting.

The BS-3s will be developed and launched by NASDA for broadcast services by the Japan Broadcasting Corporation (NHK) and the Japan Satellite Broadcasting Incorporated (JSB) under the operation of the Telecommunications Satellite Corporation of Japan (TSCJ).



BS-2 Receiving Antenna developed by Japan Broadcasting Corporation (NHK).

NHK broadcasts can be received on the main islands of Japan with a parabolic antenna approximately one meter across. The outlying islands require an antenna approximately four meters across.



Artist's concept of
Broadcasting Satellite-3
(BS-3a, BS-3b)

(3) Meteorological Observation

Meteorological satellite plays a vital role in meteorological observation, especially in the Pacific where observation points are scarce.

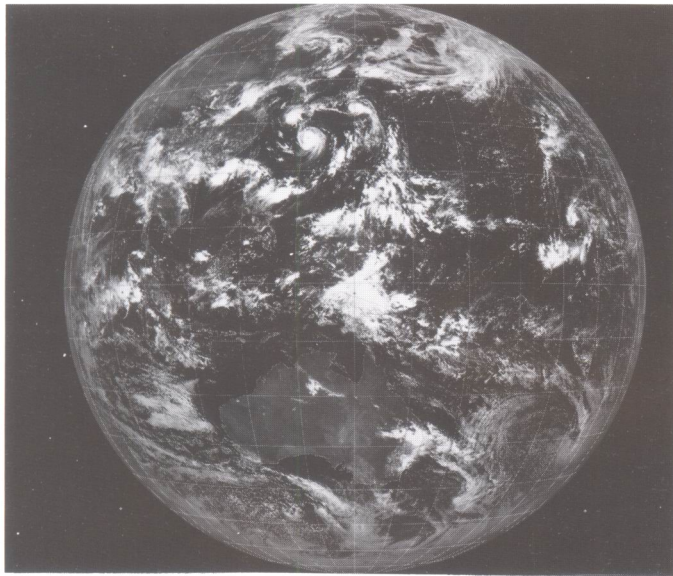
Japan already launched three meteorological Satellite Geostationary Meteorological Satellite "HIMAWARI"(GMS) in July 1977, "HIMAWARI-2"(GMS-2) in August 1982, and "HIMAWARI-3"(GMS-3) in August 1984 which is now in service.

Cloud distribution pictures and temperature data taken by GMS-3 are being used for daily weather forecast and typhoon warnings.

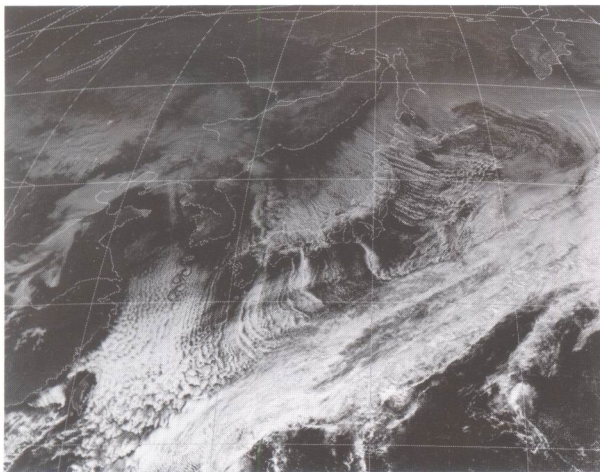
In 1989, Geostationary Meteorological Satellite-4(GMS-4) is expected to be launched to replace "HIMAWARI-3".

Weather data from GMS-3 are also received and used by Asia-Pacific countries and contribute to weather forecast service in countries including Australia.

GMS, GMS-2 and GMS-3 were developed and launched by NASDA for use by the Japan Meteorological Agency.



Cloud image taken by GMS-3



Marked Cloud lines showing are typical cold air outbreak from Siberia, by GMS-3.

(4) Materials Processing in Space

Outer space has environmental characteristics unobtainable on the earth such as microgravity, high vacuum and intense solar energy, which can be effectively utilized for manufacturing compound alloys, semiconductors and pharmaceutical products, of superior quality to those produced on the earth.

Thus, Japan is preparing for materials processing tests in space by using the Space Shuttle/Spacelab. 34 experiments on material processing, life science and space technology will be made by a Japanese payload specialist aboard the spacelab.



Arist's concept of the First Material Processing Test aboard the Space Shuttle/Spacelab.



Japanese payload specialist, (from L) Mamoru Mohri, Chiaki Naito and Takao Doi, one of whom will perform experiments aboard the Spacelab/Space Shuttle.

(5) Remote Sensing

The National Space Development Agency of Japan (NASDA) receives and processes data from NASA Landsat 4 and 5 and provides the acquired information to various users through Remote Sensing Technology Center of Japan (RESTEC).

The development of Japan's first remote sensing satellite (MOS-1) is continuing and its launching scheduled for 1987. Furthermore, Japan's Earth Resources Satellite-1 (ERS-1) is expected to be launched in 1991.

Research is also being carried out on observation technology such as Visible and Near Infrared Radiometer and Synthetic Aperture Radar, etc. These technologies will be applied to many areas: marine observation, resource exploration, land observation, agriculture, forestry, fisheries, environmental protection, prevention of natural disasters, surveillance of coastal regions, etc. Research is also being carried out on application technology in various fields of utilization such as information analysis technology for exploring resources.

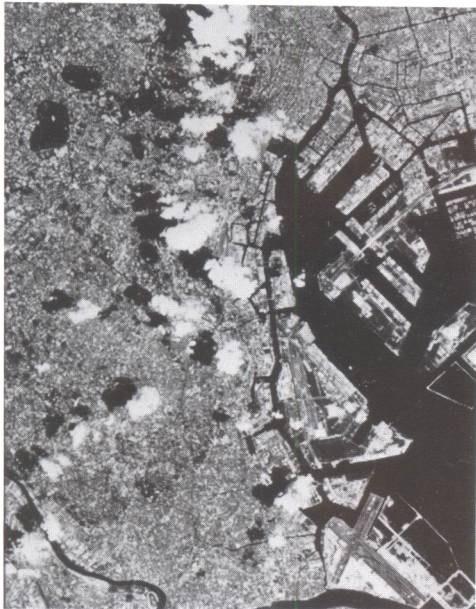
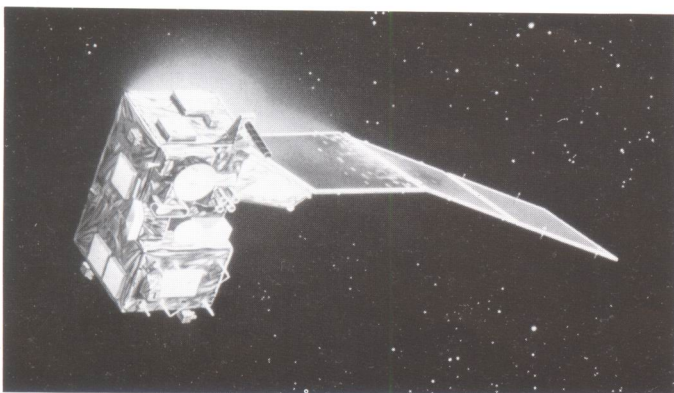


Image of Tokyo observed by LANDSAT's thematic mapper



Marine Observation Satellite-1 (MOS-1).

(6) Scientific Research

(i) The earth and its periphery

Japan is advanced in radio exploration physics, study of aurora and observation of plasma waves: all fields involving solar radiation, thermospheric and atmospheric structure surrounding the earth.

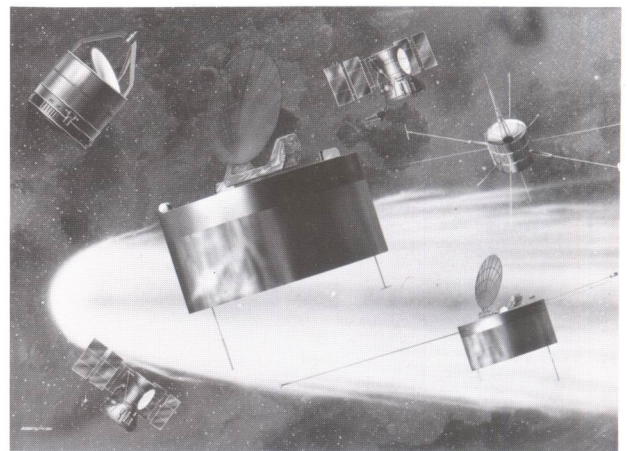
(ii) Exploration of the Halley's comet

Observation of Halley's comet and solar wind plasma are now being carried on. A pair of interplanetary spacecraft "SAKIGAKE" and "SUISEI" were launched in 1985, and they approach to the Halley's comet in March, 1986.

In the course to the comet, both spacecrafts have achieved many interesting new results in the cometary physics and solar wind physics.

(iii) Changes in the earth's environment caused by solar activities were studied by various scientific satellites. The seventh scientific satellite "HINOTORI" took X-ray pictures of many solar flares, violent phenomenon of the sun.

Astronomy from space observing X-rays, gamma-rays and infrared-rays has led to discoveries of new wonders of the Universe. The fourth scientific satellite "HAKUCHO" watched X-ray stars over six years. At present, the eighth scientific satellite "TENMA" is probing the extreme astronomical objects such as neutron stars and black holes. The eleventh scientific satellite ASTRO-C will soon be launched in quest of puzzling far-distant galaxies.



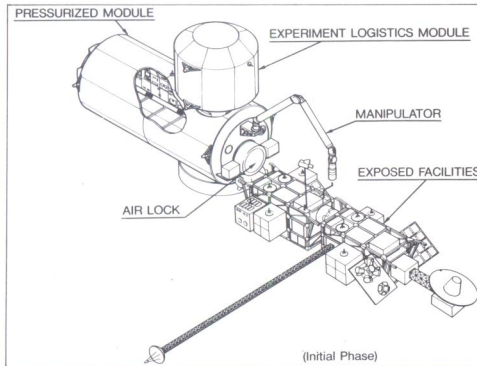
Halley's comet flyby mission

(7) Participation in the U.S. Space Station Program

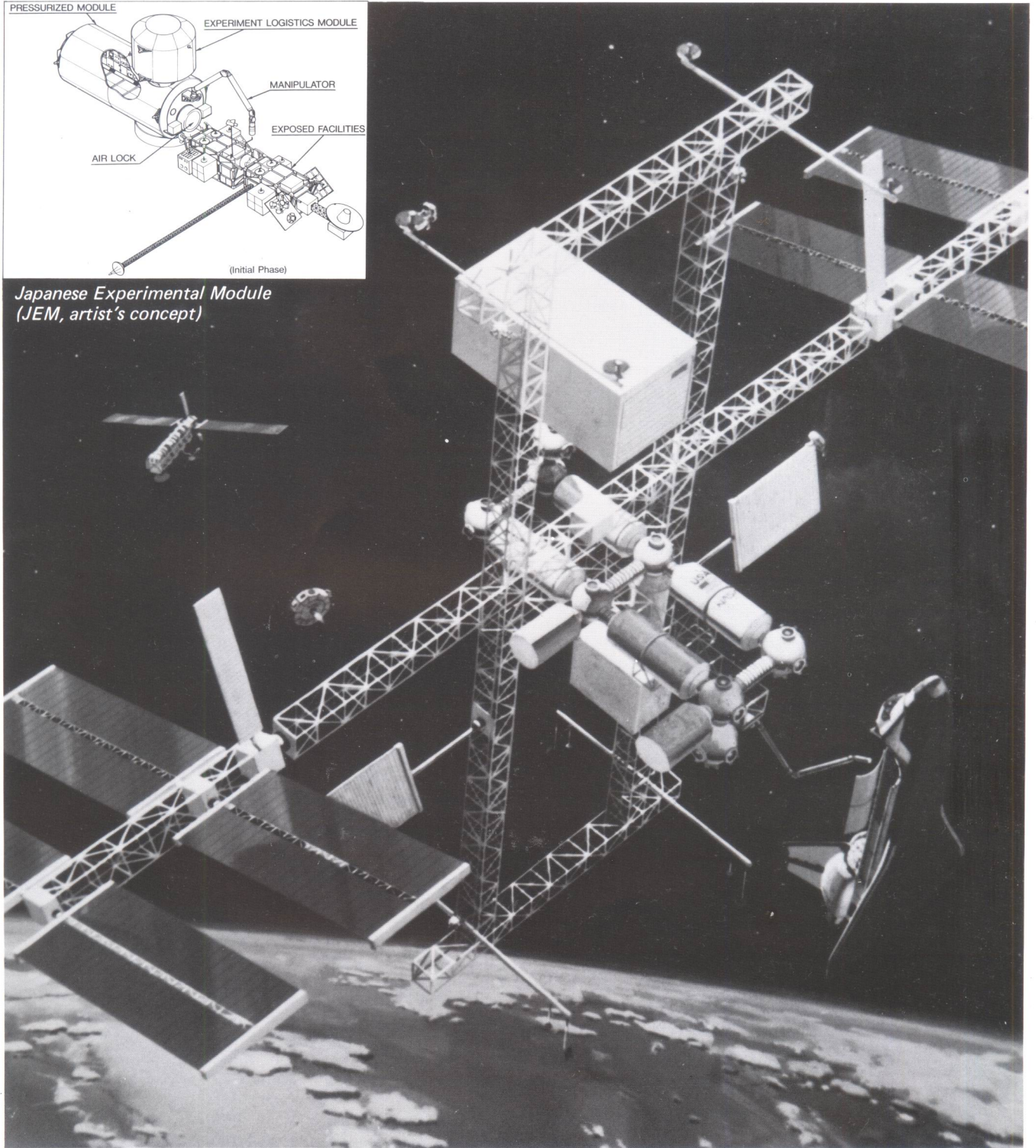
In January 1984, U.S. President Reagan directed NASA to develop the permanently manned Space Station, and requested Canada, European Countries, Japan to participate in this program from its Preliminary Design Phase. This space station program is extremely important, because it makes available new forms of means in space activities to

mankind, promotes international cooperation, develops space technologies, and advances industrial activities into space.

Japan decided to participate in the Preliminary Design Phase, and has been conducting research and development on the technologies for attached-type Experimental Module and been studying utilization of the Space Station.



*Japanese Experimental Module
(JEM, artist's concept)*



Space Station

5. Space Activities in Japan

(1) Table of Satellites

(a) Applications Satellite (developed by NASDA)

	Satellites	Main Purposes	Weight (kg)	Orbit			Launch Vehicle	Launch Date
				Type	Altitude (km)	Inclination to Equator (degrees)		
Launched	Engineering Test Satellite-I (ETS-I) "KIKU"	Confirmation of launching technology, acquiring of satellite tracking and control technology, test of antenna extension, measuring of satellite environment	82	Circular	980 1,100	47	N-I-1	Sept. 9, 1975
	Ionosphere Sounding Satellite (ISS) "UME"	Observation of world wide distribution of critical frequencies of ionosphere, world wide distribution of sources of radio noises, etc.	139	Circular	990 1,010	70	N-I-2	Feb. 29, 1976
	Engineering Test Satellite-II (ETS-II) "KIKU-2"	Acquisition of satellite injection technology into geostationary orbit, test of attitude control function, functional test of onboard equipment	130	Geostationary (130 E. Long.)			N-I-3	Feb. 23, 1977
	Geostationary Meteorological Satellite (GMS) "HIMAWARI"	Participation in the Global Atmospheric Research Program (GARP), observation of cloud formation over the Western Pacific and Asian regions, collection and distribution of weather data	315	Geostationary (160E. Long.)			(U.S. Delta)	July 14, 1977
	Medium-Capacity Communications Satellite for Experimental Purposes (CS) "SAKURA"	Communications test with quasi-millimeter waves, etc., using satellite system, establishment of technology for operating satellite communications system	340	Geostationary (150E. Long.)			(U.S. Delta)	Dec. 15, 1977
	Ionosphere Sounding Satellite (ISS-b) "UME-2"	Same as purposes of (ISS) "UME"	141	Circular	980 1,220	69	N-I-4	Feb. 16, 1978
	Medium-Scale Broadcasting Satellite for Experimental Purposes (BSE) "YURI"	Transmission test of TV images etc. by satellite system, establishment of technology for operating satellite broadcasting system	355	Geostationary (110 E. Long.)			(U.S. Delta)	Apr. 8, 1978
	Experimental Communications Satellite (ECS) "AYAME"	Establishment of technology for launching, tracking and controlling geostationary satellite and communications test with millimeter waves	130	Planned geostationary orbit not achieved			N-I-5	Feb. 6, 1979
	Experimental Communications Satellite (ECS-b) "AYAME-2"	Same as purposes of (ECS) "AYAME"	130	Planned geostationary orbit not achieved			N-I-6	Feb. 22, 1980
	Engineering Test Satellite-IV (ETS-IV) "KIKU-3"	Confirmation of N-11 launch vehicle performance, functional test of space equipment	638	Geostationary transfer	220 35,820	29	N-II-1	Feb. 11, 1981
	Geostationary Meteorological Satellite-2 (GMS-2) "HIMAWARI-2"	Development of technology related to meteorological satellite, improvement of weather forecast	296	Geostationary (120 E. Long.)			N-II-2	Aug. 11, 1981
	Engineering Test Satellite-III (ETS-III) "KIKU-4"	Development of technology common to satellites requiring high electric power, functional test of space equipment	385	Circular	1,000	45	N-I-7	Sept. 3, 1982
	Communications Satellite-2 (CS-2a, CS-2b) "SAKURA-2a" "SAKURA-2b"	Development of communications satellite technology, as well as provision of satellite communication services with outlying inlands, etc.	350	Geostationary (132 E. Long.) (136 E. Long.)			N-II-3 N-II-4	Feb. 4, 1983 Aug. 6, 1983

	Satellites	Main Purposes	Weight (kg)	Type	Orbit		Launch Vehicle	Launch Date
					Altitude (km)	Inclination to Equator (degrees)		
	Broadcasting Satellite-2 (BS-2a, BS-2b) "YURI-2a" "YURI-2b"	Development of broadcasting satellite technology, elimination of poor TV reception areas	350		Geostationary (110 E. Long.) (110 E. Long.)		N-II-5 N-II-7	Jan. 23, 1984 Feb. 12, 1986
	Geostationary Meteorological Satellite-3 (GMS-3) "HIMAWARI-3"	Improvement of meteorological service, development of technology on meteorological satellites	350		Geostationary (140 E. Long.)		N-11-6	Aug. 3, 1984
Scheduled	Experimental Geodetic Payload (EGP)	Confirmation of two-stage H-1 launch vehicle performance, experiments on the new geodetic network	685	Circular	1,500	50°	H-I(T•F) (2 stage)	1986
	Marine Observation Satellite-1 (MOS-1)	Establishment of technology common to earth observation satellites, observation of oceanic phenomena primarily on color and temperature of ocean surface	750		Sun-synchronous		N-II	1987
	Engineering Test Satellite-V (ETS-V)	Confirmation of H-1 launch vehicle performance, establish- ment of basic technology of three- axis geostationary satellites, mobile satellite communication experiments	550		Geostationary (150° E. Long.)		H-I(T•F) (3 stage)	1987
	Communications Satellite-3 (CS-3a, CS-3b)	Continuance of communication services, responding to the increas- ing and diversifying demand for communications, development of technology on higher levels of communication satellites	550		Geostationary (132 E. Long.) (136 E. Long.)		H-I H-I	1988 (CS-3a) 1988 (CS-3b)
	First Material Processing Test (FMPT)	Space experiments on material processing and, life science the properties of space.		Circular	300		Space Shuttle	1988
	Geostationary Meteorological Satellite-4 (GMS-4)	Improvement of meteorological service, development of technology on meteorological satellites	400		Geostationary (140 E. Long.)		H-I	1989
	Broadcasting Satellite-3 (BS-3a, BS-3b)	Continuance of communication services, response to the increas- ing and diversifying demand for broadcasting development of technology on higher levels of broadcasting on satellites	550		Geostationary (110 E. Long.) (110 E. Long.)		H-I H-I	1990 (BS-3a) 1991 (BS-3b)
	Earth Resources Satellite-1 (ERS-1)	Establishment of active sensing technology, monitoring of natural resources agriculture, forestry, fishery, environmental protection, prevention of natural disasters, surveillance of coastal regions, etc.	1,400	Circular	570		H-I	1991 (Projected)
	Engineering Test Satellite-VI (ETS-VI)	Confirmation of H-II launch vehicle performance, establish- ment of bus technology of large- scale three-axis geostationary satellite, development of tech- nology on next-generation satellite communications including mobile and intersatellite communications.	2,000		Geostationary		H-II	1992 (Projected)

(b) Scientific Satellite (developed by ISAS)

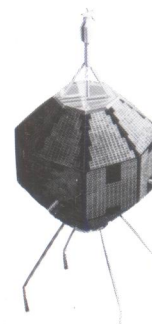
	Satellites	Main Purposes	Weight (kg)	Orbit		Inclination to Equator (degrees)	Launch Vehicle	Launch Date
				Shape	Altitude (km)			
Launched	OHSUMI	Learning of satellite launch technology and engineering test of satellite	24	Elliptic	350 5,140	31	L-4S-5	Feb. 11, 1970
	Test Satellite (MS-T1) "TANSEI"	Test of satellite environment and functions after entry into orbit	63	Circular	990 1,110	30	M-4S-2	Feb. 16, 1971
	The First Scientific Satellite (MS-F2) "SHINSEI"	Observation of ionosphere, cosmic rays, solar HF radio emissions, etc.	66	Elliptic	870 1,870	32	M-4S-3	Sept. 28, 1971
	The Second Scientific Satellite (REXS) "DENPA"	Observation of plasma waves, plasma density, electron flux, electromagnetic waves, geomagnetism, etc.	75	Elliptic	250 6,570	31	M-4S-4	Aug. 19, 1972
	Test Satellite (MS-T2) "TANSEI-II"	Measuring of launch vehicle performance, engineering test of satellite	56	Elliptic	290 3,240	31	M-3C-1	Feb. 16, 1974
	The Third Scientific Satellite (SRATS) "TAIYO"	Observation of solar soft X-rays, solar vacuum ultraviolet radiations, geocoronal ultraviolet lines, ionosphere, etc.	86	Elliptic	260 3,140	32	M-3C-2	Feb. 24, 1975
	Test Satellite (MS-T3) "TANSEI-III"	Measuring of launch vehicle performance, engineering test of satellite	129	Elliptic	790 3,810	66	M-3H-1	Feb. 19, 1977
	The Fifth Scientific Satellite (EXOS-A) "KYOKKO"	Observation of plasma density, temperature and composition, spectrum of electron energy, geocoronal distribution, etc., snapshots of ultraviolet aurora image	126	Elliptic	630 3,970	65	M-3H-2	Feb. 4, 1978
	The Sixth Scientific Satellite (EXOS-B) "JIKIKEN"	Observation of electron density, particle rays, plasma waves, wave-particle interaction, etc.	90	Highly elliptic	220 30,100	31	M-3H-3	Sept. 16, 1978
	The Fourth Scientific Satellite (CORSA-b) "HAKUCHO"	Observation of X-ray stars, X-ray bursters, very soft X-ray nebulae, etc.	96	Near circular	550 580	30	M-3C-4	Feb. 21, 1979
	Test Satellite (MS-T4) "TANSEI-IV"	Measuring of launch vehicle performance, engineering test of satellite	185	Near circular	520 610	39	M-3S-1	Feb. 17, 1980
	The Seventh Scientific Satellite (ASTRO-A) "HINOTORI"	Observation of two-dimensional hard X-ray image of solar flares, solar particle rays, etc.	188	Near circular	580 640	31	N-3S-2	Feb. 21, 1981
	The Eighth Scientific Satellite (ASTRO-B) "TENMA"	Observation of X-ray stars, X-ray galaxies, gamma ray burst, soft X-ray nebulae, etc.	180	Elliptic	350 600	31	M-3S-3	Feb. 20, 1982
	Space Experiments with Particle Accelerators (SPEAC)	Clarification of luminous mechanism of auroras, studies on particle-wave interactions in space plasmas, etc.	Participate in the first Spacelab Mission					Nov. 28 1983
	The Ninth Scientific Satellite (EXOS-C) "OHZORA"	Research on upper atmosphere including the stratosphere and mesosphere, etc.	200	Elliptic	300 1,000	65	M-3S	Feb. 14 1984

Satellites		Main Purposes	Weight (kg)	Orbit		Inclination to Equator (degrees)	Launch Vehicle	Launch Date	
				Shape	Altitude (km)				
Launched	Interplanetary Test Spacecraft (MS-T5) "SAKIGAKE"	Measuring of launch vehicle performance, learning of Interplanetary flight techniques, ultra-longrange communications, technology, attitude control technology etc.	138	Heliocentric			M-3SII-1	Jan. 8 1985	
	The Tenth Scientific Satellite (PLANET-A) "SUI SEI"	Research on interplanetary space plasma, observation of Halley's comet by ultraviolet imaging	125	Heliocentric			M-3SII	Aug. 19 1985	
Scheduled	Space Experi- ments with Particle Accelerators (SPEAC)	Clarification of luminous mechanism of auroras, studies on particle-wave interactions in space plasmas, etc.		Participate in the first Spacelab Mission				1986	
	The Eleventh Scientific Satellite (ASTRO-C)	Observation of X-ray sources in central core of active galaxies, detailed observation of various X-ray celestial bodies	400	Circular	500 500		M-3SII	1987	
	The Twelveth Scientific Satellite (EXOS-D)	Observation of the acceleration mechanism of auroral particles, auroral emission, etc., in the Earth's magnetosphere	300	Highly Elliptic	400 10,000		M-3SII	1989	
	The Thirteenth Scientific Satellite (MUSES-A)	Reserach on accurate orbit determination, control and high efficiency data transmission technology necessary for interplanetary exploration and conduct, test of double lunar swingby techniques.	190					M-3SII	1990
	Magnetosphere Research Satellite (GEOTA I L)	Observation with the purpose of clarifying the structure and dynamics of the magnetosphere tail that exists on the night side of the earth in bilateral cooperation.			8R _E 250R _E (R _E =6378)		Space Shuttle	1991	

(2) Development of Satellites

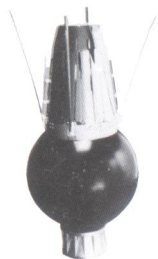
Japan has successfully launched 32 satellites and space experiments with particle accelerators since 1970. Between now and fiscal 1992 the country plans to launch 4 scientific satellites and 9 practical application satellites and conduct space experiments with particle accelerators (SEPAC) and the first materials processing test (FMPT) using the space shuttle.

Applications

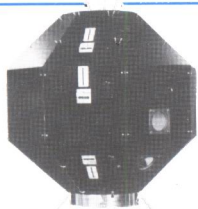


Engineering Test Satellite-1
(ETS-1) "KIKU"
Sept. 9, 1975

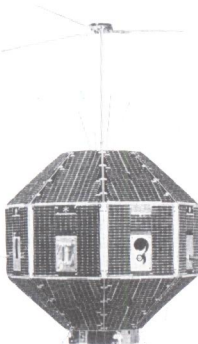
Scientific



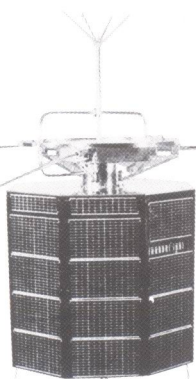
"OHSUMI"
Feb. 11, 1970



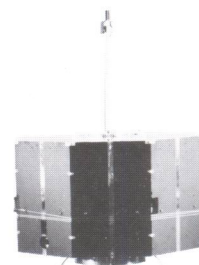
Test Satellite (MS-T1)
"TANSEI"
Feb. 16, 1971



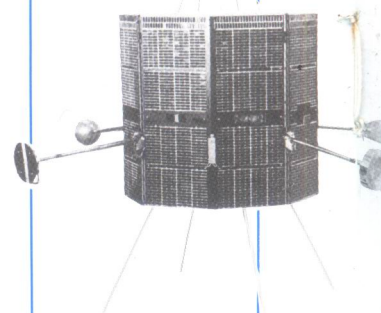
The 1st Scientific
Satellite (MS-F2)
"SHINSEI"
Sept. 28, 1971



The 2nd Scientific
Satellite (REXS)
"DENPA"
Aug. 19, 1972



Test Satellite (MS-T2)
"TANSEI-II"
Feb. 16, 1974



The 3rd Scientific
Satellite (SRATS)
"TAIYO"
Feb. 14, 1975

1970

1971

1972

1973

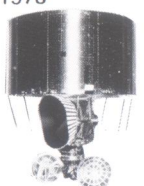
1974

1975

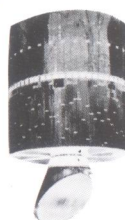
197



Engineering Test Satellite-II
(ETS-II) "KIKU-2"
Sep. 23, 1978



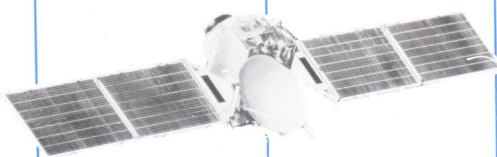
Geostationary
Meteorological
Satellite (GMS)
"HIMAWARI"
July 14, 1977



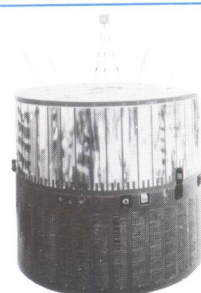
Medium-Capacity
Communications
Satellite for Experimental
Purposes (CS)
"SAKURA"
Dec. 15, 1977



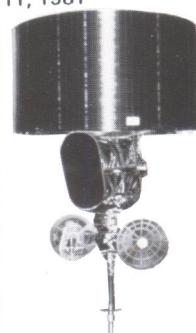
Ionosphere Sounding
Satellite (ISS-b)
"UME-2"
Feb. 16, 1978



Medium-Scale Broadcasting
Satellite for Experimental
Purposes (BSE) "YURI"
April 8, 1978



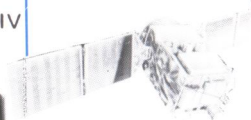
Engineering Test Satellite-IV
(ETS-IV) "KIKU-3"
Feb. 11, 1981



Geostationary
Meteorological
Satellite-2 (GMS-2)
"HIMAWARI-2"
Aug. 11, 1981



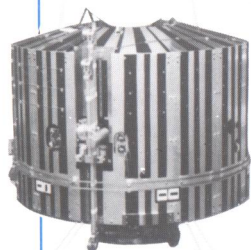
Communications
(CS-2a) "SAKURA"
Feb. 4, 1983



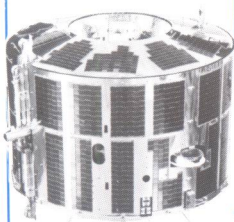
Engineering Test Satellite-III
(ETS-III) "KIKU-4"
Sep. 3, 1983



Communications
(CS-2b) "SAKURA"
Aug. 6, 1983 (CS-2b)



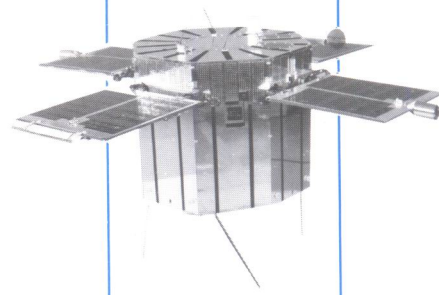
Test Satellite
"TANSEI-III"
Feb. 19, 1977



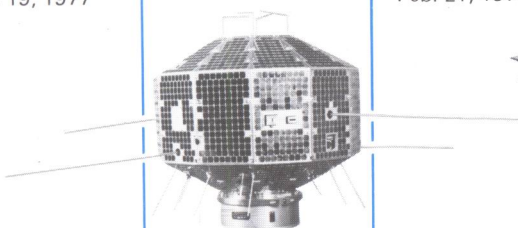
The 5th Scientific Satellite
(EXOS-A) "KYOKKO"
Feb. 4, 1978



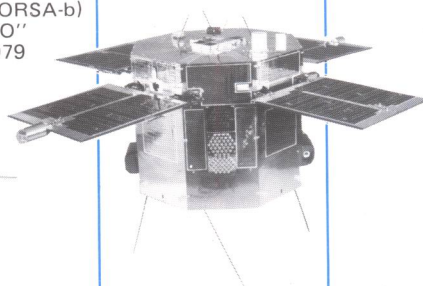
The 4th Scientific
Satellite (COSA-b)
"HAKUCHO"
Feb. 21, 1979



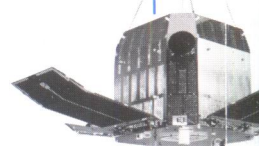
The 7th Scientific
Satellite (ASTRO-A)
"HINOTORI"
Feb. 21, 1981



The 6th Scientific
Satellite
(EXOS-B) "JIKIKEN"
Sept. 16, 1978



Test Satellite (MS-T4)
"TANSEI-IV"
Feb. 17, 1980



The 8th Scientific
Satellite (ASTRO-B)
"TENMA"
Feb. 20, 1982

1976

1977

1978

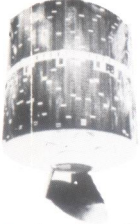
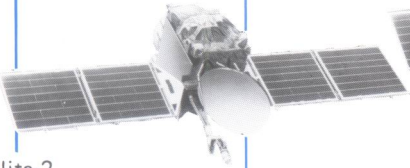
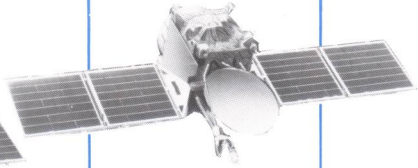
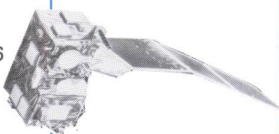
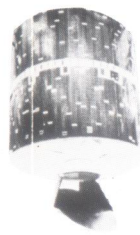
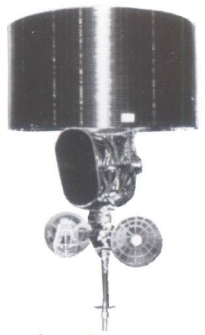
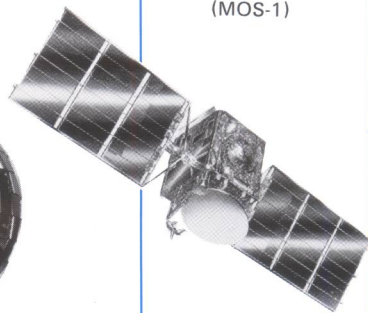
1979

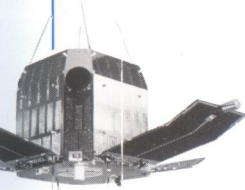
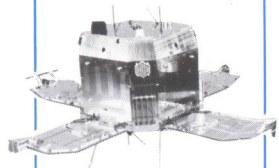
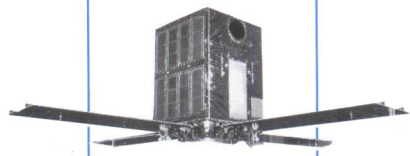
1980

1981

1982

1983

 Communications Satellite-2 (CS-2a) "SAKURA-2a" Feb. 4, 1983 (CS-2a)	 Broadcasting Satellite-2 (BS-2a) "YURI-2a" Jan. 23, 1984	 Broadcasting Satellite-2b (BS-2b) "YURI-2b" Feb. 12, 1986	 Marine Observation Satellite-1 (MOS-1)	 Experimental Geodetic Payload (EGP)	 Communications Satellite-2a (CS-3a)
 Communications Satellite-2 (CS-2b) "SAKURA-2b" Aug. 6, 1983 (CS-2b)	 Geostationary Meteorological Satellite-3 (GMS-3) "HIMAWARI-3" Aug. 2, 1984	 Engineering Test Satellite-V (ETS-V)	 Communication Satellite-3b (CS-3b)		

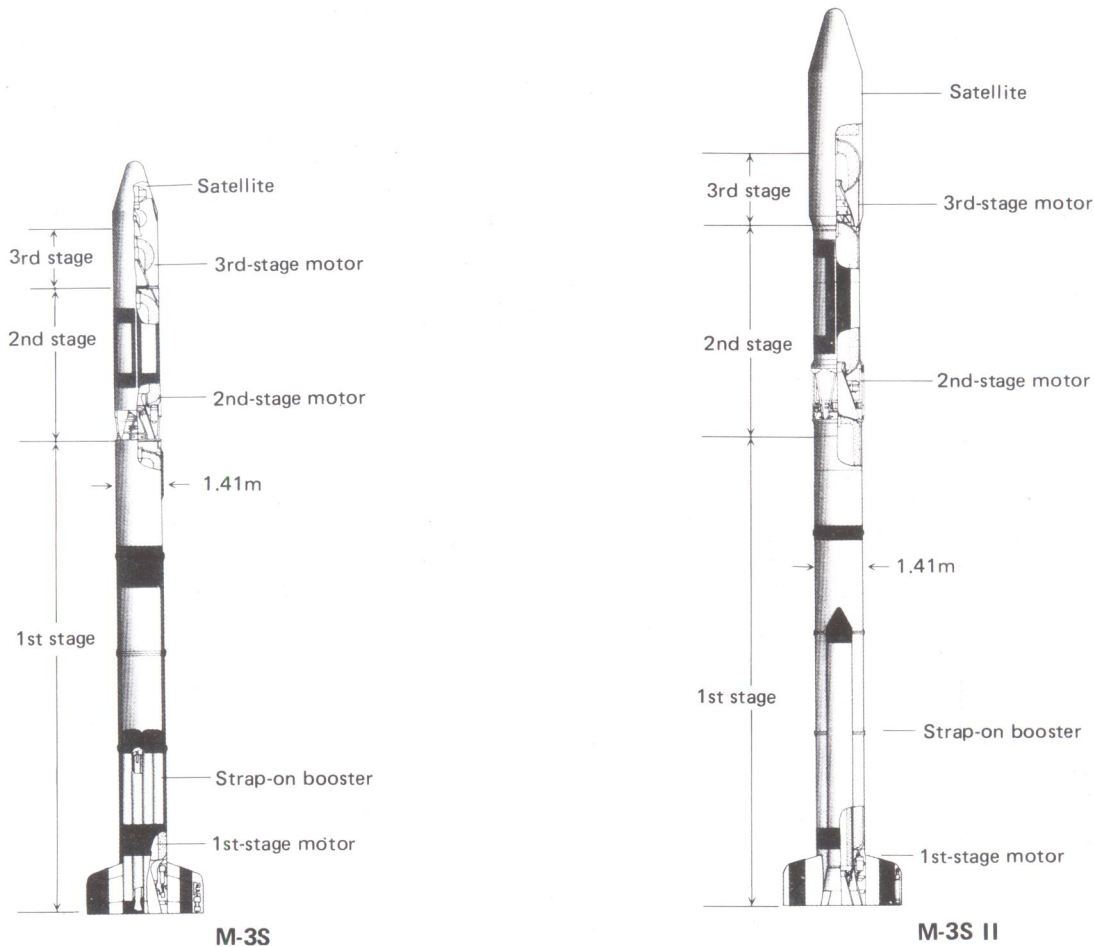
 The 8th Scientific Satellite (ASTRO-B) "TENMA" Feb. 20, 1983	 The 9th Scientific Satellite (EXOS-C) "OHZORA" Feb. 14, 1984	 Interplanetary Test Spacecraft (MS-TS) "SAKIGAKE" Jan. 8	 The 10th Scientific Satellite (PLANET-A) "SUI SEI" Aug. 18, 1986		 The 11th Scientific Satellite (ASTRO-C)
1983	1984	1985	1986	1987	1988

(3) Development of Launch Vehicles

At present, Japan's launch vehicles for satellites consist of the M(Mu)-family launch vehicles for scientific satellites, developed by the Institute of Space and Astronautical Science, and the N-I and N-II launch vehicles developed by

National Space Development Agency of Japan (NASDA) for satellites developed for practical applications. NASDA is now developing two types of new launch vehicles. One is called H-I launch vehicle which is capable of launching larger satellites expected in the latter half of the 1980s. The other is called H-II launch vehicle which can lift up geostationary satellites weighing about two tons expected in 1990s.

M Launch Vehicles



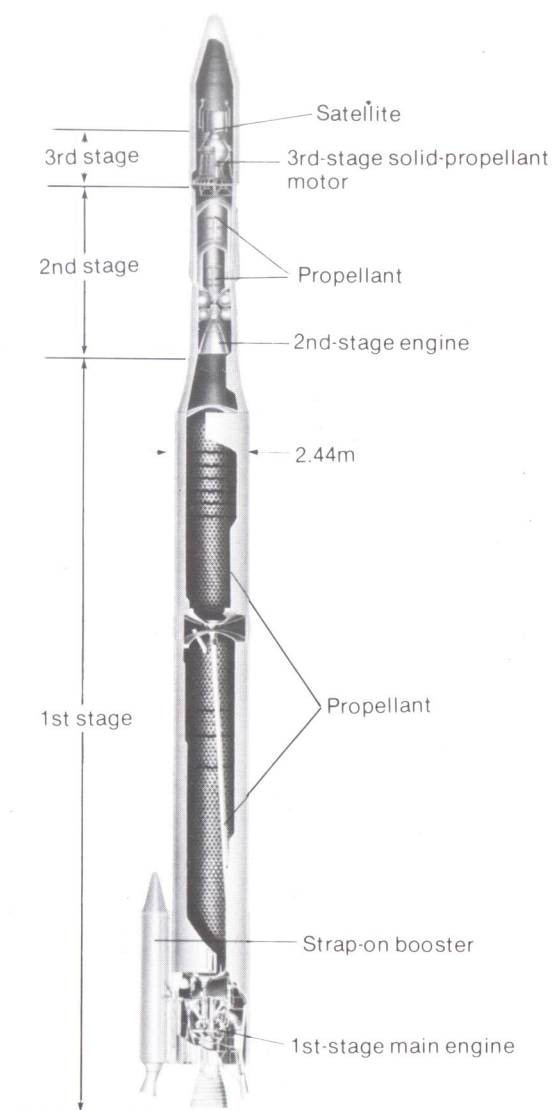
Overall length		23.8m	about 28m
Total weight		49.5t	about 6 ft
Payload capacity		290 Kg/250 Km	770 Kg/250 Km
No. of stages		3	3
Propellant	1st stage	Solid	Solid
	2nd stage	Solid	Solid
	3rd stage	Solid	Solid

The M-3S launch vehicle is a three-stage solid-propellant vehicle capable of launching a scientific satellite weighing about 300 kilograms into low-altitude orbit. It has a full guidance and control capability by means of a secondary fluid injection thrust vector control systems.

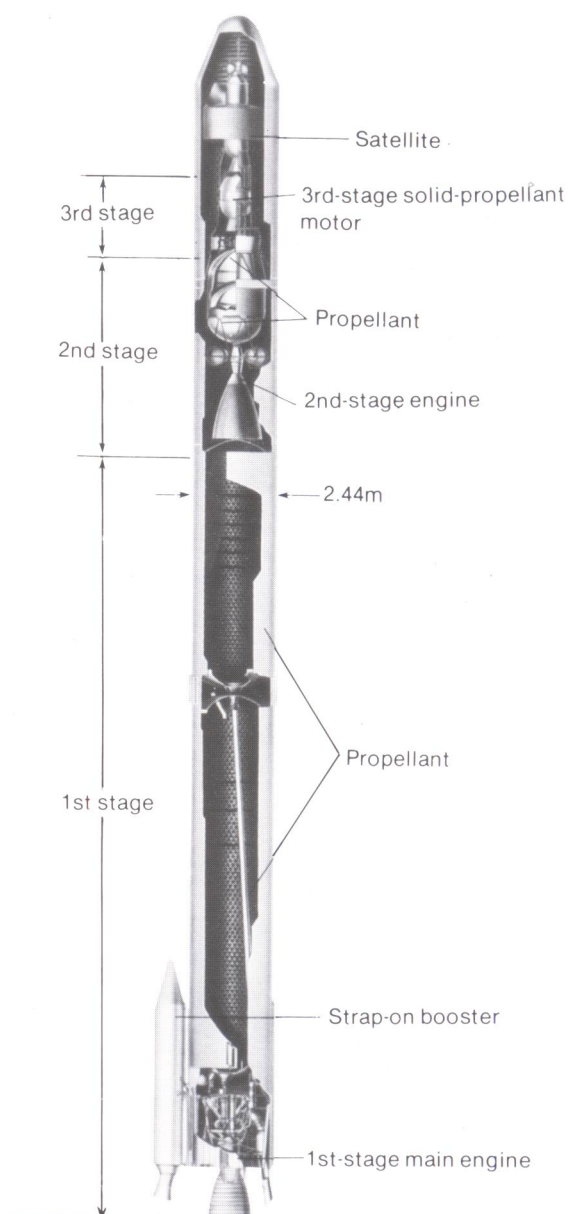
The M-3SII launch vehicle, an improved version of the M-3S launch vehicle, is a three-stage, solid-propellant vehicle that provides a capability of launching a scientific satellite weighing about 670 kilograms into a low-altitude orbit. It uses thrust augmentation of the second and the third stage motors and the strap-on boosters.

• All
Over
Tot
Payl
No. f
Prop

a. N-I Launch Vehicle



b. N-II Launch Vehicle



● All numerical values are rounded off

		N-I	N-II
Overall length		32.6m	35.4m
Total weight		90 t*	135 t*
Payload Capacity		130 kg/geostationary	350kg/geostationary
No. of stages		3	3
Propellant	1st stage	Liquid	Liquid
	2nd stage	Liquid	Liquid
	3rd stage	Solid	Solid

* Excluding the satellite and attach fitting

The N-I launch vehicle is a three-stage vehicle capable of launching a satellite weighing about 130 kilograms into geostationary orbit. Liquid-propellant is used for the first and second stages and solid-propellant for the third stage.

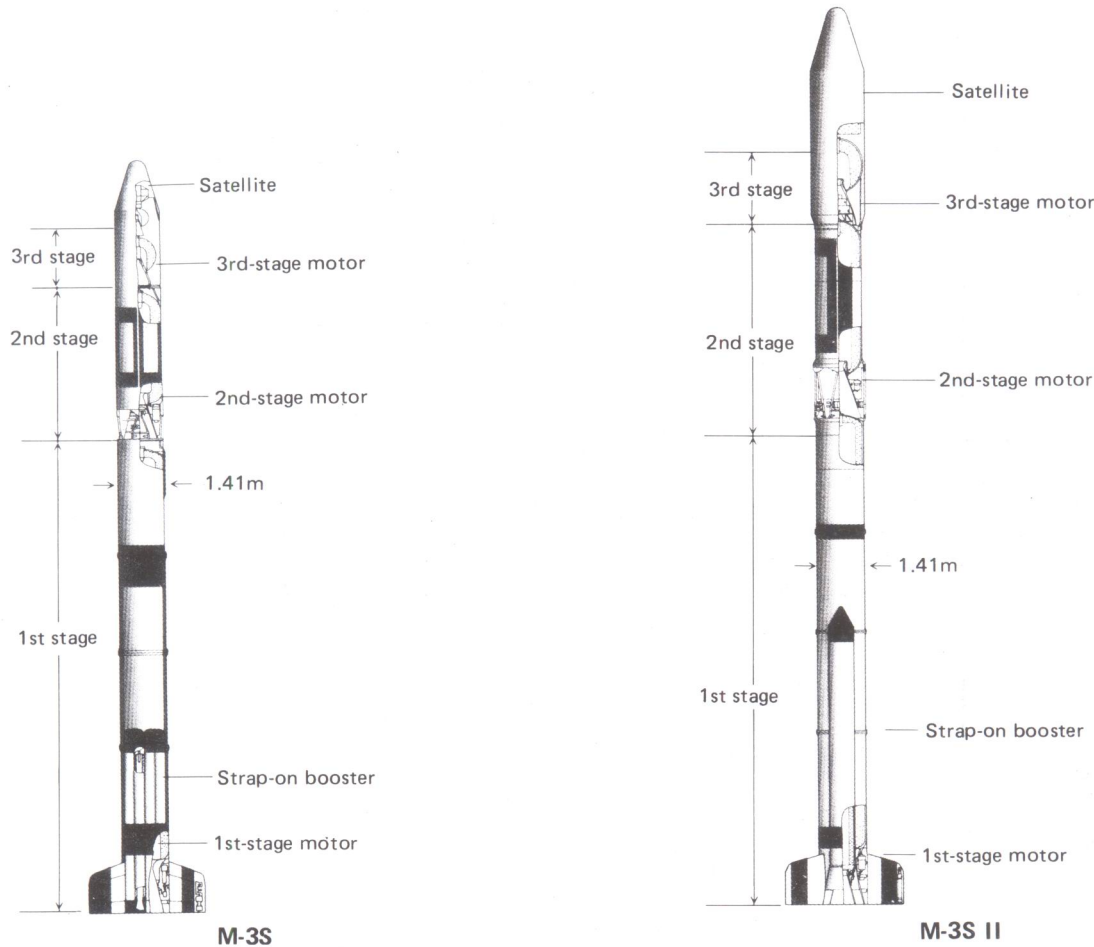
The N-II launch vehicle is a three-stage vehicle capable of launching a geostationary satellite weighing about 350 kilograms. It is an improved version of the N-I launch vehicle, featuring increased payload capacity and the adoption of the inertial guidance system.

(3) Development of Launch Vehicles

At present, Japan's launch vehicles for satellites consist of the M(Mu)-family launch vehicles for scientific satellites, developed by the Institute of Space and Astronautical Science, and the N-I and N-II launch vehicles developed by

National Space Development Agency of Japan (NASDA) for satellites developed for practical applications. NASDA is now developing two types of new launch vehicles. One is called H-I launch vehicle which is capable of launching larger satellites expected in the latter half of the 1980s. The other is called H-II launch vehicle which can lift up geostationary satellites weighing about two tons expected in 1990s.

M Launch Vehicles

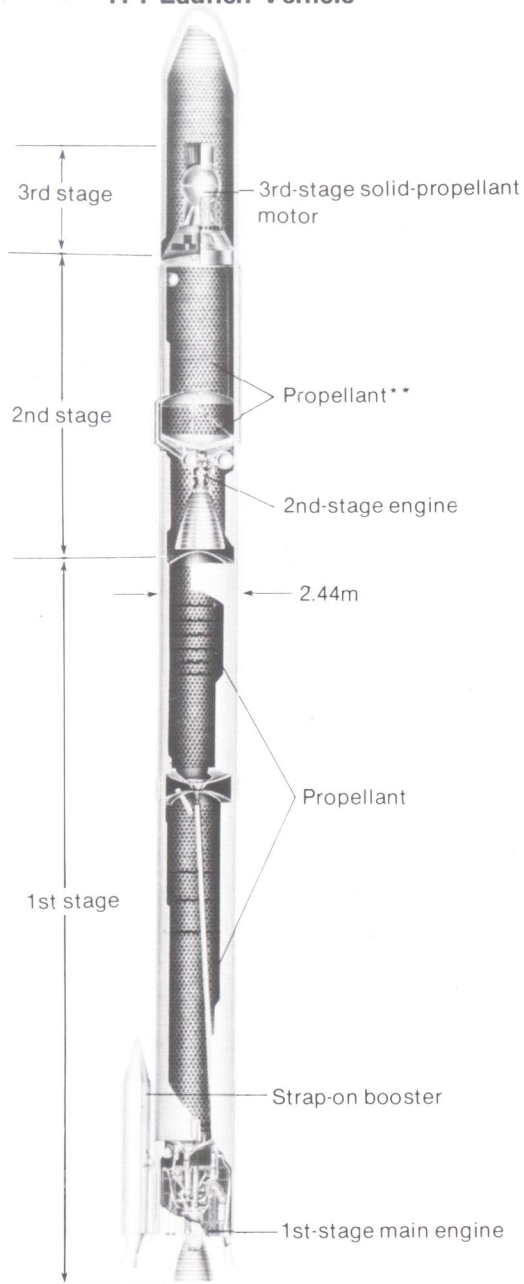


M-3S			M-3S II		
Overall length		23.8m			about 28m
Total weight		49.5t			about 6 ft
Payload capacity		290 Kg/250 Km			770 Kg/250 Km
No. of stages		3			3
Propellant	1st stage	Solid		1st stage	Solid
	2nd stage	Solid		2nd stage	Solid
	3rd stage	Solid		3rd stage	Solid

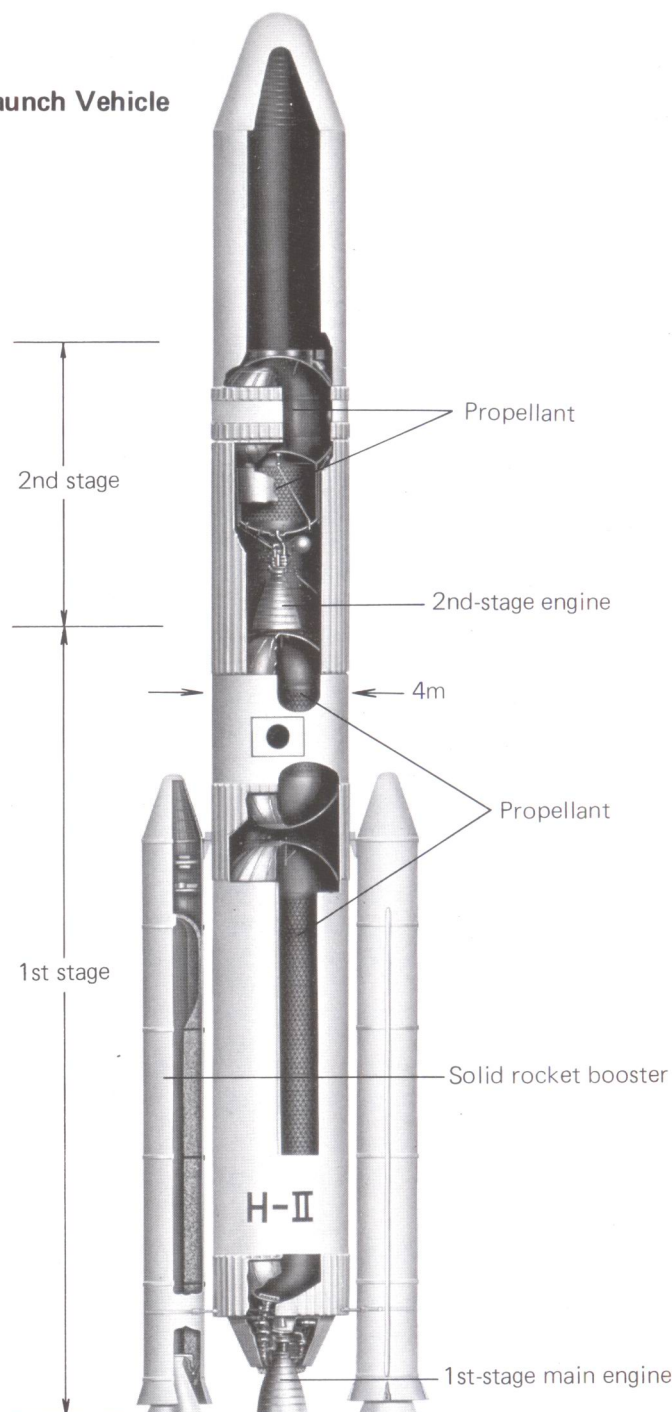
The M-3S launch vehicle is a three-stage solid-propellant vehicle capable of launching a scientific satellite weighing about 300 kilograms into low-altitude orbit. It has a full guidance and control capability by means of a secondary fluid injection thrust vector control systems.

The M-3SII launch vehicle, an improved version of the M-3S launch vehicle, is a three-stage, solid-propellant vehicle that provides a capability of launching a scientific satellite weighing about 670 kilograms into a low-altitude orbit. It uses thrust augmentation of the second and the third stage motors and the strap-on boosters.

c. H-I Launch Vehicle



d. H-II Launch Vehicle



H-I			H-II		
Overall length			40m		
Total weight			140t*		
Payload Capacity			550kg/geostationary		
No. of stages			3		
Propellant	1st stage	Liquid**	Propellant	1st stage	Liquid**
	2nd stage	Liquid		2nd stage	Liquid**
	3rd stage	Solid		3rd stage	—

** Liquid hydrogen, liquid oxygen

The H-I launch vehicle is initially being developed as a three-stage vehicle capable of launching a geostationary satellite with a weight of about 550 kilograms. This vehicle, designed to meet an age of large-sized satellites expected from the latter half of the 1980s, will use the first stage of the N-II launch vehicle for the first stage, an engine using liquid oxygen and liquid hydrogen as propellant for the second stage and a large-sized solid-propellant motor for the third stage. Also, an inertial guidance system using a built-in computer will be adopted for controlling attitude and orbit.

The H-II launch vehicle is being developed as a two-staged vehicle capable of launching a geostationary satellite weighting 2,000 kilograms. This vehicle, designed to launch large-sized satellite expected in 1990s, will use technologies achieved from the development efforts of H-I launch vehicle. It will employ engines using liquid hydrogen as propellant for the first and second stages plus two large-sized solid-propellant boosters.

6. International Cooperation

Japan is positively promoting international cooperation in space activities with the view of efficiently carrying out its space development projects and promoting international friendship.

(1) Cooperation with the U.S.

To promote cooperation in space, Space Activities Commission (SAC) and the National Aeronautics and Space Administration (NASA) of the United States have held regular meetings of their Standing Senior Liaison Group (SSLG) since 1980. Under its framework, 18 joint projects are conducted.

These projects include the collaborative study of Halley's comet, the study of ocean dynamics, the measurement of cloud height by satellite stereography, and VLBI experiments for studying crustal plate motions.

The memorandum of understanding for the preliminary design phase of the space station was concluded between STA and NASA, and STA has been engaging in research and development on the attached-type Experimental Module.

(2) Cooperation with ESA

A regular consultation is held annually with the European Space Agency (ESA) in accordance with official notes exchanged in 1972. Information is exchanged on such matters as remote sensing, telecommunications satellites and tracking. The possibility of cooperation is also discussed.

(3) Cooperation with Canada

Japan and Canada are cooperating mainly in the field of remote sensing, communications and space science.

(4) Cooperation with ESCAP Nations

The Japan Meteorological Agency is directly transmitting cloud pictures, obtained from Geostationary Meteorological Satellite (GMS), to the 13 member nations of the U.N. Economic and Social Commission for Asia and the Pacific (ESCAP) via satellite.

Also, the Japan International Cooperation Agency (JICA) annually holds training courses on satellite communications and remote sensing data analysis.

In September 1980, Japan held a seminar for the ESCAP nations that was jointly sponsored by the United Nations, on remote sensing applications for land-use planning.

In 1982, STA held a seminar for the ESCAP nations on remote sensing applications for agriculture and forestry.

(5) Cooperation with U.N.

In the United Nations, Japan has joined the Committee on the Peaceful Uses of Outer Space (COPUOS), positively taking part in debate at COPUOS, its Legal Sub-Committee and Scientific and Technical Sub-Committee.

Meanwhile, Japan participated in the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space, called "UNISPACE 82".

In addition, Japan is engaged in positive space-related activities as a member of such specialized agencies of the United Nations as the International Telecommunication Union (ITU), the International Maritime Organization (IMO), the International Civil Aviation Organization (ICAO) and the World Meteorological Organization (WMO).

(6) Other Cooperation

Japan is taking a positive role as a member of the International Telecommunications Satellite Organization (INTELSAT) and the International Maritime Satellite Organization (INMARSAT).

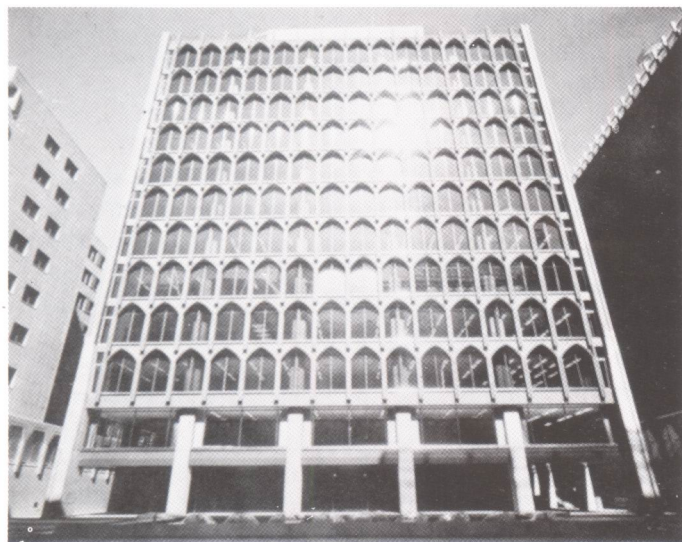
7. Industry's Role in Space Activities

KEIDANREN (Federation of Economic Organizations; Chairman: Yoshihiro Inayama) is a private, non-profit, economic organization representing all branches of economic activities in Japan. In maintaining close contact with various industrial and financial sectors both at home and abroad, it endeavors not only to find practical solutions to economic problems but also to contribute to the sound development of the economies of Japan and countries around the world.

Keidanren was established in August 1946 through the merger of several economic and industrial organizations active since prewar days.

Since then Keidanren has grown into a nation-wide body with 118 associated and 845 corporate members as of 1985.

Headed by internationally acknowledged leaders of the Japanese business community, Keidanren plays an active and influential role in the achievement of harmonious economic prosperity for all mankind.



KEIDANREN building

Space Activities Promotion Council

KEIDANREN's space development activities, dating back to 1961, are now conducted under the Space Activities Promotion Council, established on June 10, 1968.

The primary objectives of the council are:

- (1) To review the current space development system in Japan,
- (2) To improve indigenous technological development capability and to promote domestic production,
- (3) To further international cooperation with advanced and developing countries.

Toward these objectives the council maintains close cooperation with the government in the formulation of space development programs and endeavors to achieve national consensus on space development activities.

This independent, private, non-profit council is made up of 94 companies and professional trade association that are engaged in space activities as of 1986.

Officers

- Chairman: Koji Kobayashi
(Chairman, NEC Corporation)
- Vice Chairmen: Gakuji Moriya
(Counselor, Mitsubishi Heavy Industries, Ltd.)
Shoichi Saba
(President and Representative Director, Toshiba Corporation)

Publication

1. "Uchu." This biannual bulletin describes space development activities of current interest both in Japan and the rest of the world. Distribution of this Japanese booklet is limited to members.
2. "Uchu Kaihatsu Handbook." This handy book, in Japanese, is published biennially to explain all aspects of the current and future developments in Japan's space activities including cooperation with foreign countries. Price per copy is ¥3,200.
3. "Space in Japan." This biennial English pamphlet introduces Japanese space activities. Distribution is free for overseas readers.

Secretariat

- Director General: Hiroshi Morikawa
Address: 9-4, Ohtemachi 1-chome, Chiyoda-ku,
Tokyo, Japan
- Postal Code: 100
Telephone: Tokyo (03) 279-1411
Telex: 222-3188 KDR TOKJ
Cable: KEIDANREN TOKYO



Symposium on the Space Station organized by Space Activities Promotion Council.

Profile of Members (in alphabetical order)

1. Name of company (address)
2. Name of president
3. Telephone number
4. Main space development-related products
(or items handled)
5. Name of office in charge of space development
6. Name of manager of office in charge of space
development

1. Anritsu Corporation

- 5-10-27, Minami-Azabu, Minato-ku, Tokyo
2. Yugo Fujita
3. Telephone: (03) 446-1111
4. INMARSAT Ship Terminals
Electronic Measuring Instruments.
5. Radio Products Division
Measuring Instruments Division
6. Kiyomi Shimizu
General Manager of Radio Products Division
Osamu Tsunoda
General Manager of Measuring Instruments Division

1. Asahi Glass Co., Ltd.

- 2-1-2, Marunouchi, Chiyoda-ku, Tokyo
2. Takeo Sakabe
3. Telephone: (03) 218-5661

1. Bridgestone Corporation

- 1-10-1, Kyobashi, Chuo-ku, Tokyo
2. Akira Ieiri
3. Telephone: (03) 567-0111

1. C. Itoh & Co., Ltd.

- 2-5-1, Kita-Aoyama, Minato-ku, Tokyo
2. Isao Yonekura
3. Telephone: (03) 497-2121
4. Satellite Attitude Control Equipment
Star Simulator
Three axis Motion Simulator
Electro Optical Tracking System
Electro Optical Instrumentation
TWT and TWTA
5. Aerospace Department
Satellite Communications Business Development
Department
6. Akira Sato
General Manager, Aerospace Department
Akihiko Mori
General Manager, Satellite Communications Business
Development Department
Yoshio Wakasa
Manager, Aerospace Section No. 2

1. Daicel Chemical Industries, Ltd.

- Toranomon Mitsui Bldg., 8-1, Kasumigaseki 3-chome,
Chiyoda-ku, Tokyo
2. Yoshifumi Kubota
3. Telephone: (02) 507-3235
4. Rocket Motor, Ejection Seat Systems, Gun Propellant
5. Rocket & Propellant Division
6. Mamoru Ohya
General Manager

1. Daido Oxygen Co., Ltd.

- 72-1, Unagidani-Nakano-cho, Minami-ku, Osaka
2. Kazuo Yamada
3. Telephone: (06) 252-1381
4. Cryogenic Equipments such as storage tank, tank lorry,
pump and test stand for liquefied hydrogen
5. (1) Kanto Branch
(2) Chemical Machinery & Equipment Dept.
(3) Quality Control Dept.
6. Masazumi Kaneko
Director and General Manager
Tadahiko Handa
General Manager
Hisao Sinkawa
General Manager

1. The Dai-ichi Kangyo Bank, Ltd.

- 1-1-5, Uchi-Saiwai-cho, Chiyoda-ku, Tokyo
2. Nobuya Hagura
3. Telephone: (03) 596-1111

1. Denki Kagaku Kogyo K.K.

- 1-4-1, Yuraku-cho, Chiyoda-ku, Tokyo
2. Noboru Shynohara
3. Telephone: (03) 507-5104

1. The Dowa Fire & Marine Insurance Co., Ltd.

- 3-5-15, Nihonbashi, Chuo-ku, Tokyo
2. Masao Okazaki
3. Telephone: (03) 274-5511
4. Satellite Insurances (Pre-Launch, Launch, Third Party
Legal Liability)
5. Aviation Department
6. Yoshitane Kitano
General Manager
Masayoshi Tarumi
Manager
Shuichi Saimura
Manager

1. Ebara Corp.

- 11-1, Haneda-Asahi-cho, Ohta-ku, Tokyo
2. Seiji Hatakeyama
3. Telephone: (03) 743-6111

1. The Export-Import Bank of Japan

- 1-4-1, Ohtemachi, Chiyoda-ku, Tokyo
- 2. Masataka Ohkura
- 3. Telephone: (03) 287-1221

1. The Fuji Bank Ltd.

- 1-5-5, Ohtemachi, Chiyoda-ku, Tokyo
- 2. Takuji Natsuzawa
- 3. Telephone: (03) 216-2211

1. Fuji Heavy Industries Ltd.

- 1-7-2, Nishi-Shinjuku, Shinjuku-ku, Tokyo
- 2. Toshihiro Tajima
- 3. Telephone: (03) 347-2506
- 4. Design of large structure for space station
- 5. Head Office: Commercial Business, Aircraft Div.
Utsunomiya Manufacturing Div.: No.1 Engineering Dept.,
Aircraft Engineering Div.
- 6. Head Office: Johei Manda, General Manager, Commercial
Business, Aircraft Div.
Utsunomiya Manufacturing Div.: Takeshi Nakao, Manager,
No.1 Engineering Dept. Aircraft Engineering Div.

1. Fujitsu Limited

- 1-6-1, Marunouchi, Chiyoda-ku, Tokyo
- 2. Takuma Yamamoto
- 3. Telephone: (03) 216-3211
- 4. (1) Satellite Communications Equipment
Single Channel Per Carrier Terminal (SCPC)
Small Earth Station
PCM-TDMA System
TDMA Burst Modem
- (2) Space-Borne Electronics Equipment
Radio Atmospheric Noise Measurement Sybsystem (RAM)
Satellite-Borne Data Processing Equipment
Rocket-Borne PCM Telemetry System
Visible & Thermal Infrared Radiometer (VTIR)
- (3) Data Processing Systems in Space Development
Tracking & Control System for Satellite and Probe
Meteorological Satellite Data Processing System
Radio Astronomical Observation Data Processing
System
Communication & Broadcasting Satellite Tracking &
Control System
Ship-Borne Meteorological Data Acquisition &
Processing System
Remote Sensing Data Processing System
Range Safety & Monitoring System
- (4) Material Processing in Space Environment
- (5) Space-borne Electronic Device
GaAs Microwave Power and Low Noise FET
Solid State Microwave Power Amplifier
MCT Infrared Detector
- 5. Space Development Promotion Group
Space Systems Department, Systems Engineering Group
Satellite Communication Systems Development Division
Radio Engineering Department, Radio Division

Special Electronics Systems Division
Space and Radio Division, Fujitsu Laboratories Ltd.
Fujitsu System Integration Laboratories Ltd. (FSI)
FACOM Division, FACOM-HITAC Ltd.

6. Bunichi Oguchi

Executive Vice President
Mamoru Mitsugi
Managing Director
Mikio Ohtsuki
Managing Director
Yoichi Ueda
General Manager, Space Development Promotion Group
Osamu Miwa
Deputy General Manager, Space Development Promotion
Group and Systems Engineering Group
Sueo Ohnaka
Deputy General Manager, Space Development Promotion
Group
Tsuyoshi Kotani
Deputy General Manager, Space Development Promotion
Group
Takeshi Shoji
General Manager, Radio Division and Satellite
Communication Systems Development Division
Ichiro Ono
General Manager, Special Electronics Systems Division
Yoshihiro Kosaka
General Manager, Natural Science Systems Division
Kohji Ishizaka
Manager, Space Systems Department
Hiroshi Yamada
Managing Director, Fujitsu Laboratories Ltd.
Kaneyuki Kurokawa
Managing Director, Fujitsu Laboratories Ltd.
Tomoyoshi Yamashita
General Manager, Space and Radio Division, Fujitsu
Laboratories Ltd.
Suehiko Matsuda
Executive Director, Fujitsu System Integration
Laboratories Ltd.
Sadao Hayashi
Managing Director, Fujitsu System Integration
Laboratories Ltd.
Akio Kogachi
Manager, Systems Department, FACOM Division, FACOM-
HITAC Ltd.
Tamotsu Kashiwai
General Manager, Government & Public Marketing Division,
Fujitsu Ltd.
Yasumasa Toguchi
Manager, Space Systems Sales Department FACOM-HITAC
Ltd.

1. The Furukawa Electric Co., Ltd.

- 2-6-1, Marunouchi, Chiyoda-ku, Tokyo
- 2. Etsuji Kusakabe
- 3. Telephone: (03) 286-3001
- 4. Aluminum Plate, Parabolic Antenna
- 5. Aluminum Div., Electronics & Communication System Div.

1. Hitachi, Ltd.

- 4-6, Kanda-Surugadai, Chiyoda-ku, Tokyo
2. Katsushige Mita
3. Telephone: (03) 258-1111
4. (1) Satellite/Rocket-borne Electronics Equipment
(2) Satellite Attitude Control System
(3) Equipment for Space Station
(4) Satellite Communications Small Earth Station
(5) Earth Station for Earth Observation Satellite
(Image Data Processing, Product Generation & Product Evaluation Recording System)
(6) Image Analysis System for Earth Observation Satellite
(7) Satellite Laser Tracking System
(8) Large Size Space Simulation Chamber
(9) Electronic Parts for Space Use
5. Space Systems Division
6. Reijiro Fukutomi
Board Director, General Manager
Sadaharu Kawai
Deputy General Manager
Takao Moriyama
Planning & Engineering Dept.

1. Hitachi Zosen Corporation

- 1-1-1, Hitotsubashi, Chiyoda-ku, Tokyo
2. Toshio Murayama
3. Telephone: (03) 213-6611
5. Tokyo Office
6. Isamu Yamachika

1. The Industrial Bank of Japan, Limited

- 1-3-3, Marunouchi, Chiyoda-ku, Tokyo
2. Kaneo Nakamura
3. Telephone: (03) 214-1111
5. Industrial Research Dept. is in charge of only "research" on space development as an industry.
6. Mr. Shuji Yamamoto, Director, Industrial Research Dept.

1. Ishikawajima-Harima Heavy Industries Co., Ltd. (IHI)

- Shin Ohtemachi Bldg., 2-1 Ohtemachi 2-chome, Chiyoda-ku, Tokyo
3. Telephone: (03) 244-6496
4. (1) Rocket propulsion system: the N-II and H-I launch vehicle first stage engines, the N-II's second stage propulsion system, and propellant feed systems for liquid oxygen/liquid hydrogen engines.
(2) Attitude control system: gas jet reaction control systems for three-axis control of satellites.
(3) Experimental equipment: material processing test equipment, space station related equipment, bipropellant systems for satellites, and high-performance liquid hydrogen rocket engine system.
(4) Aerospace ground equipment: test facilities for liquid fuel rocket engine firing, solid fuel rocket motor firing, and liquid oxygen/liquid hydrogen engine propellant system.

5. Space Development Division, Aero-Engine & Space Operations, Ishikawajima-Harima Heavy Industries Co., Ltd.
5-1, Mukodai-cho 3-chome, Tanashi-shi, Tokyo 188, Japan
Telephone: (0424) 66-1602
6. Tokio Fujii
General Manager, Space Development Division

1. Iwatsu Electric Co., Ltd.

- 1-7-41, Kugayama, Suginami-ku, Tokyo
2. Sinji Hayashi
3. Telephone: (03) 334-1111
4. Rocket Engine Experiment System
Rocket Engine Observation System
Hot Firing Test System
Telemeter Check Out System
Second Stage Propulsion Control System
Rocket Engine Data Acquisition System
5. Industrial Instruments Division
Space Systems Sales & Engineering Sect.
6. Hiroshi Isshiki

1. Japan Aircraft Mfg. Co., Ltd.

- 3175, Showa-machi, Kanazawa-ku, Yokohama
2. Ritsuo Nakagawa
3. Telephone: (045) 771-1251
4. Rockets (tail fuselages and fins), Satellites
5. Engineering Div., Rocket-Target Team
6. Masaru Sakamaki
Section Chief, Marketing & Contracts Dep.
Yoshiaki Kakitsubo
Section Chief in Charge of Rockets & Satellites, Engineering Div.

1. Japan Aviation Electronics Industry, Ltd.

- 21-6, Dogenzaka 1-chome, Shibuya-ku, Tokyo
2. Motoo Hirota
3. Telephone: (03) 463-3111
4. (1) Inertial Guidance System
(2) Propellant Level Measurement Unit
(3) Inertial Sensor
(4) Inertial Attitude Reference Unit for Rocket
5. Aerospace Division
6. Ryosuke Toyoda
General Manager

1. Japan Broadcasting Corporation (NHK)

- 2-2-1, Jin'na, Shibuya-ku, Tokyo
2. Masato Kawahara
3. Telephone: (03) 465-1111
4. Broadcasting Satellite Service
5. Engineering Headquarters
6. Koichi Yabashi
Executive Director-General of Engineering
Yuko Nakamura
Executive Director-General, Engineering Headquarters

1. Japan Propellent Industry Co., Ltd.

- 23-10, Akatsuka 3-chome, Itabashi-ku, Tokyo
2. Masao Akatsu
 3. Telephone: (03) 939-3920
 4. Arrangements to treat exhaust gas and drainage, cleaning facilities, cleaning room and analysis of propellant
 5. Technical Department
 6. Takahiro Akatsu
Controller and Manager of Technical Department

1. Japan Radio Co., Ltd.

- 2-17-22, Akasaka, Minato-ku, Tokyo.
2. Koji Matsui
 3. Telephone: (0422) 45-9225
 4. Radar, Radio communications equipment, Satellite communications equipment, Remote control system, Telemetry system, Laser equipment
 5. Laboratory
 6. Masanobu Watanabe
Managing Director, General Manager of Laboratory

1. Japan Synthetic Rubber Co., Ltd.

- 2-11-24, Tsukiji, Chuo-ku, Tokyo
2. Hisashi Yoshimitsu
 3. Telephone: (03) 541-4111

1. Kajima Corporation

- 1-2-7, Motoakasaka, Minato-ku, Tokyo
2. Shoichi Kajima
 3. Telephone: (03) 404-3311
 4. Architectural Engineering Service and Construction of Space-related ground facilities
 5. Architectural Technology Development Dept.
 6. Taro Ikeda, Manager

1. Kawasaki Heavy Industries, Ltd.

- 2-4-1, Hamamatsu-cho, Minato-ku, Tokyo
2. Kenko Hasegawa
 3. Telephone: (03) 435-2971
 4. (1) Experimental Geodetic Payload
(2) Large Satellite Fairing of H-II Launch Vehicle
(3) Winged Space Vehicle
(4) Launch Facilities for the N-I, N-II, H-I and H-II Vehicles
(5) Satellite Acoustic Testing Facility, Medical Facilities to be used in the Selection and Training of Astronauts, LH2 Engine Firing Test Stand and other Ground Facilities.
(6) Space Station Project
 5. Space Systems Division
 6. Sansei Miki
Associate Director

1. Kirin Brewery Co., Ltd.

- 6-26-1, Jingu-mae, Shibuya-ku, Tokyo

2. Hideyo Motoyama

3. Telephone: (03) 499-6111
Telex: 242-5401

1. Kobe Steel, Ltd.

- 1-8-2, Marunouchi, Chiyoda-ku, Tokyo
2. Fuyuhiko Maki
 3. Telephone: (03) 218-7111
 4. Titanium alloy, Aluminum alloy
Super alloy, Composite material
Vacuum chamber system
Cryogenic Temperature Service System
 5. Technical Information & Planning Dept.
Technical Development Group
 6. Toru Yukawa
General Manager

1. Kokusai Denshin Denwa Co., Ltd.

- 2-3-2, Nishi-Shinjuku, Shinjuku-ku, Tokyo
2. Takazou Ishii
 3. Telephone: (03) 347-7531

1. Kokusai Electric Co., Ltd.

- 22-15, Toranomon 1-chome, Minato-ku, Tokyo
2. Noboru Nakamura
 3. Telephone: (03)-591-8371
 4. Command, Transmitter
 5. Government Equipment Sales Dept.
 6. Hitoshi Takemoto
Manager

1. Komatsu, Ltd.

- 2-3-6, Akasaka, Minato-ku, Tokyo
2. Syoji Nokawa
 3. Telephone: (03) 584-7111

1. Kyokuto Boeki Kaisha, Ltd.

- 2-1, Otemachi 2-chome, Chiyoda-ku, Tokyo
2. Hisago Miyoshi
 3. Telephone: (03) 244-3703
 4. Rocket Test Stand
Test Equipment for Gyros and Accelerometers
Pressure Transducers and Accelerometers
 5. Aerospace Systems Dept.
 6. Tadaaki Okubo
Manager, Aerospace Systems Dept.
Hitoshi Ueda
Chief

1. The Kyowa Bank, Ltd.

- 1-1-2, Ohtemachi, Chiyoda-ku, Tokyo
2. Tetsuo Yamanaka
 3. Telephone: (03) 287-2111

1. Kyushu Electrical Construction, Ltd.

- 23-35, Nanokawa 1-chome, Minami-ku, Fukuoka City
2. Katsutoshi Hiraki
 3. Telephone: (092) 523-1231
 4. Installations of Electrical Facilities, Air-conditioning and Plumbing, Water Treatment and Communication
 5. Tokyo Business Dept., Business Headquarters
Business Section, Kagoshima Branch
Tanegashima Rocket Base Construction Office
 6. Satoshi Tanaka
Manager, Tokyo Business Dept., Business Hq.
Takeshi Kasagi
Chief, Business Sect., Kagoshima Branch
Masahiro Fujimoto
Site Manager, T.R.B. Construction Office

1. Marubeni Corporation

- 1-4-2, Ohtemachi, Chiyoda-ku, Tokyo
2. Kazuo Haruna
 3. Telephone: (03) 282-3330, 3331
 4. Martin Marietta's Space Technology
Space Utilization Program
LANDSAT Ground Terminal System etc.
 5. Aerospace Development Department
—Business Development Section
—Space Utilization Section
 6. Toyoyasu Kobatake
General Manager, Aerospace Development Dept.
Sigeru Mizunuma
Deputy General Manager, Aerospace Development Dept.
Kuniyoshi Inoshita
Assistant to the General Manager, Aerospace Development Dept.
Takashi Katoh
General Manager, Business Development Section
Aerospace Development Dept.
Hirombumi Tanaka
General Manager, Space Utilization Section
Aerospace Development Dept.

1. Matsushita Communication Industrial Co., Ltd.

- 3-1, Tsunashima-Higashi 4-chome, Kohoku-ku, Yokohama
2. Michitake Ishizawa
 3. Telephone: (045) 531-1231
 4. Measuring instruments, Electric Programming Timer,
900MHz Telemeter Rocket Launching Control System
 5. Radio Telecommunication Division
 6. Takeno

1. Meisei Electric Co., Ltd.

- 2-5-7, Koishikawa, Bunkyo-ku, Tokyo
2. Chikanao Urakawa
 3. Telephone: (03) 814-5111
Telex: 2722152
 4. (1) Satellite & Rocket Borne Equipments
(2) Ground Support Systems
—Tracking Radar System
—Satellite Receiving System
—Satellite & Rocket Data Telemetry System

(3) Space Shuttle Borne Equipments

5. Moriya Factory (Engineering Division)
6. Tatsunosuke Takemoto
Director
Tomohiro Oguchi
Manager, Engineering Division

1. Mitsubishi Corporation

- 6-3, Marunouchi, 2-chome, Chiyoda-ku, Tokyo
2. Yoohei Mimura
 3. Telephone: (03) 210-2121
 4. Hardware and Software of:
Launch Vehicle Systems
Satellite Systems
Downrange Station
Space Shuttle Utilization Programs
Space Station Programs
Space Utilization Programs
Other Space Related Activities
 5. Aerospace Dept.
 6. Akira Fukai
General Manager, Aerospace Dept.

1. The Mitsubishi Bank, Ltd.

- 2-7-1, Marunouchi, Chiyoda-ku, Tokyo
2. Hajime Yamada
 3. Telephone: (03) 240-1111

1. Mitsubishi Chemical Industries, Ltd.

- 2-5-2, Marunouchi, Chiyoda-ku, Tokyo
2. Seiji Suzuki
 3. Telephone: (03) 283-6111

1. Mitsubishi Electric Corporation

- 2-2-3, Marunouchi, Chiyoda-ku, Tokyo
2. Moriya Shiki
 3. Telephone: (03) 218-3330
Telex: (03) 218-3640
 4. (1) Communications Satellites: CS, ECS, ECS-b, CS-2a, CS-2b, CS-3a, CS-3b, Subsystems and Equipment for INTELSAT-III, INTELSAT-V, ARABSAT.
(2) Observation Satellites: ISS, ISS-b, ERS-1, Structure for MS-T5/PLANET-A, AOCS/Telemetry and Command Unit for MOS-1.
(3) Engineering Test Satellites: ETS-II, ETS-IV, ETS-V, Subsystems and Equipment for ETS-III
(4) Spacelab-Space Station: SEPAC, Japan Exp. Module, etc.
(5) Spacecraft Hardware: Attitude and Orbit Control Subsystem, Communication and Data Handling Subsystem Power Subsystem, Antenna Subsystem, Solar Array Subsystem, Propulsion Subsystem, Thermal Subsystem, Structure Subsystem.
Components and Devices for Space Use: AOCE, Nutation Damper, Magnetically Suspended Flywheel, Transponder, Up-Down Converter, TTC Unit, Launch Environment Monitor, Central Processing Unit, PCU, DC/DC Converter, Shaped Beam Antenna,

Multi Beam Antenna, Phased Array Antenna, Feeder, Multiplexer, G/KFRP Solar Array Substrate, CFRP Deployable Solar Array, Solar cell Module, Ga-As Solar Cell, MPD Arc Jet Engine, Ion Engine, Thermal Louver, Heat Pipe, CFRP Panel/Cylinder, IC, LSI, IR-CCD, and etc.

- (6) INTELSAT Earth Stations, Regional and Domestic Satellite Communications Earth Stations.
- (7) Remote Sensing System: Image Processing System, Synthetic Aperture Radar (SAR), Microwave Scanning Radiometer(MSR), Shortwave Infrared Radiometer.
- (8) Launch and Mission Operation
- (9) Rocket-borne Equipment
5. Advanced Space Systems Department
Space Program & Communication Systems Department
Space Systems Department, Kamakura Works
Space Composite Material Department, Sagami Works
Satellite Communications Systems Department,
Communications Equipment Works (Osaka)
Special Semiconductors Department, Kita-Itami Works
Space Systems Research Department, Central Research Laboratory (Osaka)
6. Hiroshi Morikawa
Managing Director
Takashi Ikemoto
General Manager, Advanced Space Systems Department
Norio Kitsukawa
Manager, Space Program & Communications Systems Department
Chikao Kinoshita
Manager, Space Systems Department, Kamakura Works
Takeo Kinase
Manager, Space Composite Material Department, Sagami Works
Masakazu Takeuchi
Associate General Manager, Communications Equipment Works
Toshiyoshi Watanabe
Manager, Special Semiconductor Department, Kita-Itami Works
Akemi Futagawa
Manager, Space Systems Research Department, Central Research Laboratory

1. Mitsubishi Heavy Industries, Ltd.

2-5-1, Marunouchi, Chiyoda-ku, Tokyo

2. Yotaro Lida
Telex: J22443 HISHIJU
4. (1) N-I, N-II, H-I and H-II Rocket
System Integration, Vehicle Structures and Engines
(2) Rocket Ground Equipment, Launch Facilities and Cryogenic Engine Test Stands
(3) Solid Rocket Chambers
5. Space Systems Department
Space Systems Department
Machinery & Space Equipment Dept.
6. Etsuro Matsumoto
General Manager, Space Systems Dept.
Shinya Nagashima
Manager, Space Systems Dept.

Takaho Miyagaki

Manager, Machinery & Space Equipment Dept.

1. Mitsubishi Precision Company, Ltd.

13-16, Mita 3-chome, Minato-ku, Tokyo

2. Hideo Ohta
3. Telephone: (03) 453-6424
4. (1) Guidance and Control System for Rocket
(2) Inertial Navigation System
(3) Inertial Reference Unit for Satellite
(4) Fly Wheel
(5) Components (Gyroscope, Accelerometer)
(6) Mission Simulator
5. Marketing Department No. 2
6. Hirosuke Takahashi
General Manager
Marketing Department No. 2

1. Mitsubishi Research Institute, Inc.

2-3-6, Ohtemachi, Chiyoda-ku, Tokyo

2. Shigekiyo Mukai
3. Telephone: (03) 270-9211

1. Mitsubishi Space Software Co., Ltd.

2-4-1, Hamamatsucho, Minato-ku, Tokyo

2. Sadeteru Yamada
3. Telephone: (03) 435-4718
4. System Engineering and Software Development for Space Program
5. Program Office Operations Group
Technical Marketing Department
6. Yohdoh Kameo
Chief Engineer
Masaru Fujii
Manager
Mitsuo Hani
Manager

1. Mitsui & Co., Ltd.

2-1, Ohtemachi, 1-chome, Chiyoda-ku, Tokyo

2. Koichiro Ejiri
3. Telephone: (03) 285-1111
4. Hardware, Software & Services for Launching Vehicle
Satellite
Spacelab
Free Flyer
Space Station
Other Space Related Programs
5. Aerospace Department
Aerospace Systems Division
6. Yoshihiro Imai
General Manager, Aerospace Department

1. Mitsui Engineering & Shipbuilding Co., Ltd.

5-6-4, Tsukiji, Chuo-ku, Tokyo

2. Kazuo Maeda
3. Telephone Number: (03) 544-3246

4. (1) Engineering and Construction of Ground Facilities and Equipment for Aerospace Use.
- (2) Application and Supply of Materials and Surface Treatment for Aerospace Components.
5. Aerospace Systems Department
6. Hiroshi Hashizume
General Manager of Aerospace Systems Department

1. The Mitsui Trust & Banking Co., Ltd.

- 2-1-1, Nihonbashi-Muromachi, Chuo-ku, Tokyo
2. Seiichi Kawasaki
3. Telephone: (03) 270-9511

1. NAC Incorporated

- 1-2-7, Nishi-Azabu, Minato-ku, Tokyo
2. Keinosuke Nakajima
3. Telephone: (03) 404-2321
4. Flying Object Photo-Instrumentation System
Cinetheodolite Airborne use Camera
High Speed Video System for Field and Airborne Use
Remote Sensing Image Data Processing System
5. Space and Aviation of Marketing Department
6. Akira Abe

1. NEC Corporation

- 33-1, Shiba 5-chome, Minato-ku, Tokyo
2. Tadahiro Sekimoto
3. Telephone: (03) 454-1111
4. (1) Satellites: Engineering Test
Satellite (ETS-I), Geostationary
Meteorological Satellite (GMS), GMS-2, GMS-3,
Marine Observation Satellite-1 (MOS-1), Broadcasting
Satellite-3 (BS-3), Astronomy Satellite-B "Sakigake"
(ASTRO-B), "Suisei" (PLANET-A), etc.
- (2) Satelliteborne Subsystems and Equipment:
Telemetry Transmitter, Command Receiver, Range and
Range Rate Transponder, On Board Computer,
Attitude Control Sensors, Visual and Infrared Remote
Sensor, Synthetic Aperture Radar, Radar Altimeter,
Satellite Communications Transponder, etc.
- (3) Rocketborne Equipment:
Telemetry Transmitter, Command Receiver, Command
Destruct Receiver, Inertial Guidance and Control
Equipment, etc.
- (4) Ground Support Equipment:
Launch Operation Control System, Telemetry Tracking
and Control System, Range and Range Rate
Equipment, Satellite Remote Sensing Earth Station
etc.
- (5) Satellite Communications Earth Stations:
INTELSAT Standard-A.B.C., Regional and Domestic,
TRansportable and Mobile Earth Station.
- (6) Satellite Launching and Mission Operation Support
Services.
- (7) Components and Electronic Devices for Space
Equipment:
IC, LSI, CCD, TWT, etc.
5. Space Development Sales Division
Space Development Division

Microwave and Satellite Communications Division
Satellite Communications Systems Division
Guidance and Electro-Optics Division
Radio Application Division
Space and Laser Communications
Development Division

6. Yukio Kaito
Senior Vice President and Director
Takahiko Tanaka
Associate Senior Vice President (Government Sales)
Takaji Kuroda
Vice President
Yasushi Nakamura
General Manager, Space Development Sales Division
Tadao Shimamura
General Manager, Space Development Division
Seijiro Yokoyama
General Manager, Microwave and Satellite Communications
Division
Kouichi Yoshimoto
General Manager, Satellite Communications Systems
Division
Yoshihito Ueno
General Manager, Space and Laser Communications
Development Division
Toshiyuki Izutani
General Manager, Guidance and Electro-Optics Division
Mamoru Yamaguchi
General Manager, Radio Application Division

1. NEC Aerospace Systems, Ltd.

- 5-31-10, Shiba, Minato-ku, Tokyo
2. Masaya Tanaka
3. Telephone: (03) 453-5511
4. System Engineering and Software Development for Space
Program
5. NEC Yokohama Plant and NEC Nakagawara Technical
Center
6. Masamichi Kimura
Senior Vice President
Shigeo Yokoyama
Manager

1. NEC-Honeywell Space Systems, Ltd.

- 7-15, Shiba 5-chome, Minato-ku, Tokyo
2. Isao Matsukasa
3. Telephone: (03) 454-1111
4. System Designs and Analysis for Rocket Guidance
Equipment

1. Nichimen Corporation

- 2-2-2, Nakanoshima, Kita-ku, Osaka
2. Tetsuzo Hibino
3. Telephone: (06) 223-5111

1. Nippon Electronics Development Co., Ltd.

- 7-7-30, Nishi-Shinjuku, Shinjuku-ku, Tokyo
2. Saburo Matsuo
3. Telephone: (03) 367-5021

4. (1) Range Safety Operation Software
- (2) Satellite Tracking and Control Software
TACC/TACS
TAMOLIS
- (3) Satellite Communications Earth Stations Software
- (4) Rocket Telemetry and Tracking Software
- (5) SAR Data Analysis Software
5. Space and Control System Department of Systems Development Group
6. Tadahiko Nonaka

1. Nippon Mining Co., Ltd.

- 2-10-1, Toranomom, Minato-ku, Tokyo
2. Yukio Kasahara
 3. Telephone: (03) 582-2111

1. Nippon Oil & Fats Co., Ltd.

- 1-10-1, Yurakucho, Chiyoda-ku, Tokyo
2. Teruji Ogawa
 3. Telephone: (03) 283-7277
 4. (1) Solid Proppellants for Space Development and Sounding Rockets
 - (2) Electro-Explosive Device for Scientific Rockets and Satellite Launch Vehicles
 5. Propulsion System Dept.
 6. Shigetaka Imahuku
General Manager, Propulsion System Dept.

1. Nippon Sanso K.K.

- 1-16-7, Nishi-Shinjuku, Shinjuku-ku, Tokyo
2. Natsuro Ishizawa
 3. Telephone: (03) 503-2271
Telex: J24228 N-SANSO
 4. Space Simulation Chamber
Propellants Supply System for LOX/LH₂ Rocket Engine
LOX&LH₂ Storage Tank
Helium and Hydrogen Refrigerator&Liquefier
Cryogenic and High Vacuum Equipment
Multi-layer Vacuum Insulated Pipe
 5. Plant & Machinery Division
Sales Department II
 6. H. Kondoh

1. Nippon Steel Corp.

- 2-6-3, Ohtemachi, Chiyoda-ku, Tokyo
2. Yutaka Takeda
 3. Telephone: (03) 242-4111
 4. i) Pitch Carbon Fibre
 - ii) C.F.R. Composites
(such as C.R.R.P. and C/C composites etc.)
 - iii) Ti and its Alloys
 - iv) Heat Resistant Engineering Ceramics
(such as SiC, Sialon etc.)
 5. Central Research & Development Bureau
 6. Mr. Takuo Kohnno, Director

1. Nippon Telegraph and Telephone Corporation

1-1-6, Uchisaiwai-cho, Chiyoda-ku, Tokyo

2. Hisashi Shinto
3. Telephone: (03) 509-3218
4. Design and Maintenance of Satellite Communication Systems for Public Telecommunication
5. Radio Engineering Group, Engineering Department
6. Shinji Matsumoto

1. Nissan Motor Co., Ltd.

- 5-1, Momoi 3-chome, Suginami-ku, Tokyo
2. Yutaka Kume
 3. Telephone: (03) 390-1111
 4. (1) Institute of Space and Astronautical Science (ISAS)
M-3SII Launch Vehicle
K-9M Sounding Rocket
S-310 Sounding Rocket
S-520 Sounding Rocket
 - (2) National Space Development Agency of Japan (NASDA)
TT-500A Rocket
N-II Strap-on Booster (License Production)
H-I Strap-on Booster
H-II Solid Rocket Booster
 - (3) Japan Meteorological Agency (JMA)
MT-135P Sounding Rocket
 - (4) National Institute of Polar Research (NIPR)
S-310JA Sounding Rocket
 5. Aeronautical & Space Division
 6. Shoichi Nakajima
Executive Vice President and Director
Yasuhiro Sibuya
Director and General Manager, Aeronautical & Space Division
Hidemaro Wachi
General Manager, Administration Department
Shinji Tamura
General Manager, Sales and Marketing Department
Masatoshi Yamashita
Deputy General Manager, Sales and Marketing Department
Yasuyuki Kishi
Manager, Sales Section No. 1
Masahru Hama
Manager, Sales Section No. 3
Iwao Nakamura
General Manager, Space Systems Department
Takuji Murakami
Manager, Space Systems Section No. 1
Tateo Hosomura
Manager, Space Systems Section No. 2
Kazuyoshi Ninomiya
General Manager, Research and Experiment Department

1. Nisshin Flour Milling Co., Ltd.

- 19-12, Koamicho, Nihonbashi, Chuo-ku, Tokyo
2. Takashi Saeki
 3. Telephone: (03) 660-3111

1. Nissho Iwai Corporation

- 4-5, 2-chome, Akasaka, Minato-ku, Tokyo
2. Masaru Yahami

3. Telephone: (03) 588-2111
4. Components and Sub-systems for Space Station Program
Experiment Equipment for Space Environment Utilization
Software and Hardware for Satellite Telecommunication
Other Aerospace Related Activities
5. Space Project Office
Aircraft and Space Department
6. Senichi Shamoto
General Manager, Space Project Office
Nobutoshi Gonda
General Manager, Aircraft and Space Department

1. Ohbayashi Corporation

- 2-3, Kanda-Tsukasa-cho, Chiyoda-ku, Tokyo
2. Yoshio Ohbayashi
3. Telephone: (03) 292-1111

1. Oki Electric Industry Company, Ltd.

- 7-12, Toranomom 1-chome, Minato-ku, Tokyo
2. Namio Hashimoto
3. Telephone: (03) 501-3111
4. (1) Satellite Communication Earth Stations
(2) Command, Control and Communication Systems for
Rocket Launch
5. Engineering Administration Division
6. Toshiro Takahashi
Managing Director

1. Okura & Co., Ltd.

- 2-3-6, Ginza, Chuo-ku, Tokyo
2. Taketaro Takenaka
3. Telephone: (03) 566-6305
4. RCA Corporation
Fairchild Weston Systems, Inc.
5. Aerospace Department
6. Kohei Takizawa
Director & General Manager, Machinery 1st Division
Hideyo Mori
General Manager of Aerospace Department

1. Remote Sensing Technology Center of Japan

- 7-15-17, Roppongi, Minato-ku, Tokyo
2. Koohei Suzue
3. Telephone: (03) 403-1761
4. (1) Investigation & Research on Remote Sensing
Technology
(2) Collection and Distribution of Remote Sensing Data
(3) Training of Personnel on Remote Sensing
(4) Popularization and Education on Remote Sensing
(5) International Cooperation on Remote Sensing
- 5.6. Tadafumi Sakai
Senior Managing Director
Keiji Maruo
Managing Director and General Manager of Planning Dept.
& Investigation Dept.
Kenkichi Miyazaki

Director and General Manager of Research Dept.
Hiroshi Ishigami
General Manager of Data Service Dept.

1. The Sanwa Bank Ltd.

- 1-1-1, Ohtemachi, Chiyada-ku, Tokyo
2. Kenji Kawakatsu
3. Telephone: (03) 216-3111

1. Sanyo Electric Co., Ltd.

- 2-18, Keihan-Hondori, Moriguchi-shi, Osaka
2. Satoshi Iue
3. Telephone: (06) 991-1181

1. SEIKO Instruments & Electronics, Ltd.

- 6-31-1, Kameido, Kohtoh-ku, Tokyo
2. Ichiro Hattori
3. Telephone: (03) 682-1111

1. Sharp Corporation

- 22-22, Nagaike-cho, Abeno-ku, Osaka
2. Akira Saeki
3. Telephone: (06) 621-1221
4. Solar Cell
5. Engineering Center
6. Tadashi Sasaki
Senior Executive Vice President

1. Shimadzu Corporation

- 1, Kuwahara-cho, Nishinokyo, Chuo-ku, Kyoto
2. Setsuo Yokochi
3. Telephone: (075) 811-1111
4. Thruster Valve
Fill and Drain Valve
Servo Valve
5. Aircraft Equipment Plant-Kyoto
Sales-Tokyo
6. Y. Tahara
Plant Manager
H. Yajima
Sales Manager

1. Shimizu Construction Co., Ltd.

- 2-16,1, Kyobashi, Chuo-ku, Tokyo
2. Teruzo Yoshino
3. Telephone: (03) 535-4111
4. Design & Construction of Space Structures
Design & Construction of Ground Based Facilities
Material Development for Space Structures
Application Research for Remote Sensing
Project Management in Space Business
5. R & D Planning Dept.
Technology Development Div.
6. Shinji Matsumoto
Manager of R & D Planning Dept.

1. Shionogi & Co., Ltd.

- 3-12, Doshu-cho, Higashi-ku, Osaka-shi
- 2. Kazuo Yoshitoshi
- 3. Telephone: (06) 202-2161
- 5. Shionogi Research Laboratories
- 6. Taichiro Komeno, Director

1. Showa Aircraft Industry Co., Ltd.

- 3-3-7, Nihonbashi-muromachi, Chuo-ku, Tokyo
- 2. Kakuro Tsukamoto
- 3. Telephone: (03) 270-1451
- 4. Satellite Vehicle
Rocket Shell (Honeycomb-core Products)
- 5. Tokyo Sales Office
(Transportation equipment division Honey-comb sales Section)
- 6. Kiyoshi Sakurai
Managing Director

1. The Society of Japanese Aerospace Companies, Inc. (SJAC)

- Hibiya Park Bld., 518, 1-8-1, Yurakucho, Chiyoda-ku, Tokyo
- 2. Yotaro Iida
- 3. Telephone: (03) 211-5678
- 4. The main activities of the Society are,
Research and other related activities which will contribute to the development of production and distribution of aerospace vehicles and equipment as well as to improve the efficiency of enterprises concerned.
Research and other related activities which will contribute to the promotion of international cooperation such as international joint production or overseas trade.
Research and related activities which will contribute to the development of technology concerned with the production of aerospace vehicles and equipment.
Sponsorship of, or participation in aerospace exhibitions, domestic and overseas, and other activities to disseminate related information such as connection of related data and materials and issuing of publications.
- 5. Space and Research Division
- 6. Satoshi Minowa
Executive Director
Naotake Tateyama
Managing Director
Michiyoshi Shiraishi
General Manager

1. SONY Corporation

- 6-7-35, Kita-Shinagawa, Shinagawa-ku, Tokyo
- 2. Norio Ohga
- 3. Telephone: (03) 448-2111

1. Sumitomo Corporation

- 1-2-2, Hitotsubashi, Chiyoda-ku, Tokyo, Japan
- 2. Tadashi Itoh
- 3. Telephone: (03) 217-6367

- 4. (1) Environmental Control * Life Support System for Space
- (2) Secondary Propulsion System
- (3) Surface Tension Tank
- (4) Satellite On-board Equipments
- (5) Star Tracker
- (6) Accelerometer & Gyro
- (7) Flight Simulator
- (8) Ground Station
- (9) Get Away Special Experimental Equipments
- 5. Aerospace Department
- 6. T. Iwasaki
General Manager

1. Sumitomo Electric Industries, Ltd.

- 5-15, Kitahama, Higashi-ku, Osaka
- 2. Tetsuro Kawakami
- 3. Telephone: (06) 220-4141

1. Sumitomo Heavy Industries, Ltd.

- 2-1, Ohtemachi 2-chome, Chiyoda-ku, Tokyo
- 2. Shigeru Gohda
- 3. Telephone: (03) 245-4321
- 4. Result:
A total of four rocket launchers
Object:
Rocket Transportation Systems and Launching Systems for Ground Bases
Space Industry Applications Cryogenic Technology Including Helium Liquefaction Plants, Precision Machinery
- 5. Space Development Coordination Department
- 6. Takashi Takashina
General Manager, Space Development Coordination Department

1. Sumitomo Precision Products Co., Ltd.

- 2-6, Nishi Nagasu-Haondori, Amagasaki-shi
- 2. Yoji Hiraki
- 3. Telephone: (06) 482-8811

1. Suntory Limited

- 1-40, Dojimahama, 2-chome, Kita-ku, Osaka
- 2. Keizo Saji
- 3. Telephone: (06) 346-1131

1. System Development Corporation of Japan, Ltd.

- 1-13-12, Nishi-Shinjuku, Shinjuku-ku, Tokyo
- 2. Tatsuo Ide
- 3. Telephone: (03) 349-8521
- 4. (1) NASDA Tracking and Control System
Software Design and Development of Telemetry and Command Online Systems for BS-2, MOS-1, ETS-V, CS-3, etc.
Software Design and Development of NASDA-NASA, NASDA-CNES/ESA Data Transmission Systems for

BS-2, MOS-1, CS-3, ETS-V, etc.

Tracking and Control System Integration Support

(2) NASDA Space Station Program

Concept Study and Preliminary Design of JEM

Operation Control System

5. Space Systems Department, SDCJ

6. Michio Sakaba

General Manager of Space Systems Department

1. Taisei Corporation

1-25-1, Nishi-Shinjuku, Shinjuku-ku, Tokyo

2. Yasuo Satomi

3. Telephone: (03) 348-1111

4. Engineering & Construction for Earth Station

5. Technology Division

6. Hiroshi Kitamura

General Manager of Technology Div.

1. TEISAN K.K.

15-12 1-chome, Toranomon, Minato-ku, Tokyo (c/o
Nihon Gas Kyokai)

2. Michihiko Komatsubara

3. Telephone: (03) 502-0551

4. (1) Supply of liquefied gas

Transport and supply of liquefied gas and vaporized
gas

(Liquefied Hydrogen, Liquefied helium, liquefied
oxygen, liquefied nitrogen and vaporized gases)

(2) Production of high pressure gas facilities manufac-
turing plants and storing/supply facilities

(Liquefied hydrogen, liquefied helium, liquefied
oxygen, liquefied nitrogen, vaporized gases, and RJ-1)

5. (1) a. Gas service headquarters (Kobe head office)

b. Gas marketing division (Tokyo head office)

c. Gas sales division (Kobe head office)

d. Gas sales division (Tokyo head office)

(2) a. Equipment service headquarters (Kobe head office)

b. Equipment group (Tokyo head office)

c. Engineering group (Harima office)

d. Cryo system (Harima office)

6. (1) a. Seiichi Chatani, board director and executive
manager

b. Tatsuo Hinuma, board director and vice executive
manager

c. Susumu Kamishita, manager, Gas Sales Division

d. Kiyoshi Funaka, manager, Gas Sales Section

(2) a. Shiro Ueno, Board Director and Executive Manager

b. TAKUJI Hanada, Assistant Manager, Equipment
Service Headquarters

c. Harumitsu Takagi, Board Director and Assistant
Manager, Equipment Service Headquarters

d. Yoshiaki Tanaka, Assistant Manager, Cryo System
Division

1. Tokyo Aircraft Instrument Co., Ltd.

35-1, Izumi-Honcho 1-chome, Komae-shi, Tokyo

2. Atsutake Wada

3. Telephone: (03) 489-1121

4. Pressure Switch

5. The 1st Div., The 1st Engineering Dept.

6. Akira Kanai

General Manager

1. The Tokio Marine & Fire Insurance Co., Ltd.

1-2-1, Marunouchi, Chiyoda-ku, Tokyo

2. Haruo Takeda

3. Telephone: (03) 212-6211

4. Satellite Insurance and Other Space Related Risk
Insurance

5. Aviation Department

6. Teruo Nazaki

General Manager

Yasuo Yaoita

Manager

1. Toshiba Corporation

1-1, Shibaura 1-chome, Minato-ku, Tokyo

2. Shoichi Saba

3. Telephone: (03) 457-3077

4. (1) Satellite Systems:

Direct Broadcast Satellite, Engineering Test Satellite
(ETS-III), etc.

(2) Subsystems, Components and Parts for Spacecraft:
Telemetry Transmitter, Command Receiver, Command
Decoder, Sun Sensor, Earth Sensor, Shaped Beam
Antenna, Multibeam Direct Radiating Array Antenna,
Ion Engine Power Supply, Vidicon Camera, Solar Cell
Paddle, Paddle Drive Motor, Shunt Dissipator, Solar
Array Drive Electronics, Attitude Control Electronics,
Telemetry Encode, Microwave IC, Radiation Hardened
Semiconductor, TWT, Particle X-ray Monitor, STar
Sensor, Trangent Source Monitor, X-ray Focusing
Collector, Flare Monitor, Synthetic Aperture Radar,
Visible Infrared Radiometer, Ni-Cd Battery Assembly,
Ni-H2 Battery

(3) Space Station:

Namipulator Subsystem of Japanese Experiment
Module

(4) SEPAC Equipments for Space Lab 1/Space Shuttle:
Electron Beam Accelerator, High Voltage Converter,
Aurora Monitor TV

(5) Ground Equipments for Satellite System:

Tracking and Control Equipment, Vidicon Camera
Signal Reception Equipment, DBS Simple Receiver,
NNSS Receive, INMARSAT Ship Earth Station

(6) Software for Satellite System:

Satellite Tracking and Operation Control Software,
On-board Mission Equipment Operation Program,
Spacecraft Testing Program, SAR Data Processing and
ANalysis Software

6. Jun Kobayashi

Senior Managing Director and Sector Executive,
Industrial Electronics Business Sector

Tomoya Okuda

Director and Group Executive, Electronics and
Telecommunication Group

Tsutomu Monoi

Assistant Group Executive, Electronics and

Telecommunication Group
Yoneo Nishioka
General Manager, Space Programs Division
Junichiro Shiraishi
Manager, Space Programs Marketing Dept.
Masamichi Shigehara
Assistant Chief Engineer-Space Programs,
Electronics and Telecommunication Group
Yutaka Hatano
Assistant General Manager-Space Programs,
Komukai Works

1. Toray Industries Inc.

- 2-2, Nihonbashi-Muromachi, Chuo-ku, Tokyo
- 2. Yoshikazu Itoh
- 3. Telephone: (03) 245-5308
- 4. Carbon Fibre (yarn, fabric prepreg)
- 5. Torayca Department
- 6. Toshihiro Iida
General Manager, Torayca Dept.

1. Toyo Communication Equipment Co., Ltd.

- 735 Koyato, Samukawamachi, Kozagun, Kanagawa
- 2. Takeshi Kawahashi
- 3. Telephone: (0467) 74-1131
- 4. Electronic Ground Equipment for Rocket and Satellite
Rocket borne Electric Equipment
Testing Ground Equipment for Satellite
- 5. Communication System Group, R & D Div.
Space Equipment Dept.
- 6. Sohtaroh Konno
Engineering Manager, R & D Div.
Masakiyo Tada
Manager, Space Equipment Dept.

1. Toyo Communication Equipment Co., Ltd.

- 3-20-4, Nishi-shinbashi, Minato-ku, Tokyo
- 2. Takeshi Kawahashi
- 3. Telephone: (03) 459-7200
- 4. Rocket-Borned Electric Equipment
 - PCM Encoder
 - Temperature Measuring AMP & Systems
 - Regulated Power Supplies
 Space-Borned Electric Parts
 - Crystal Resonator, SAW Filter
 - Saw Delay Line
 Ground support systems and Terminals
 - Satellite Systems/Subsystems Check Out Systems
 - Standard Time & Frequency Systems
 - For Argos Sate Lite LUT & ELT
- 5. Space Equipment Dept.
Mobile Radio Communication Div.
Crystals and Components Div.
Research & Development Dept.
- 6. Masakiyo Tada (Space Equipment Dept.)
Soichiro Kanbayashi (Mobile Radio Communication Div.)
Junichiro Asahara (Crystals & Components Div.)
Shigeharu Yamada (Research & Development Dept.)

1. The Yasuda Fire & Marine Insurance Co., Ltd.

- 1-26-1, Nishi-Shinjuku, Shinjuku-ku, Tokyo
- 2. Yasuo Goto
- 3. Telephone: (03) 349-4031
- 4. Satellite Insurance and Various Insurance for Space Development
- 5. Aviation and Aerospace Department
- 6. Ikuya Itoh

1. Yokohama Rubber Co., Ltd.

- 5-36-11, Shinbashi, Minato-ku, Tokyo
- 2. Hisaaki Suzuki
- 3. Telephone: (03) 432-7111
Telex: J24673, J24196
- 4. Metal DUCT/TUBE Assembly
Heat Exchanger
Battery Box
Metal Bellows
Insulation Blanket
Quick Disconnect
Brazing Fitting
Teflon Hose Assembly
Honeycomb Panel
Parabola Antenna
Prepreg
- 5. Aerospace Division (Overseas Marketing Section)
- 6. Harukuni Nagaya
Manager, Licensing & Overseas Marketing
Keiichi Katoh
Manager, Overseas Marketing

1. Japan Space Utilization Promotion Center (JSUP)

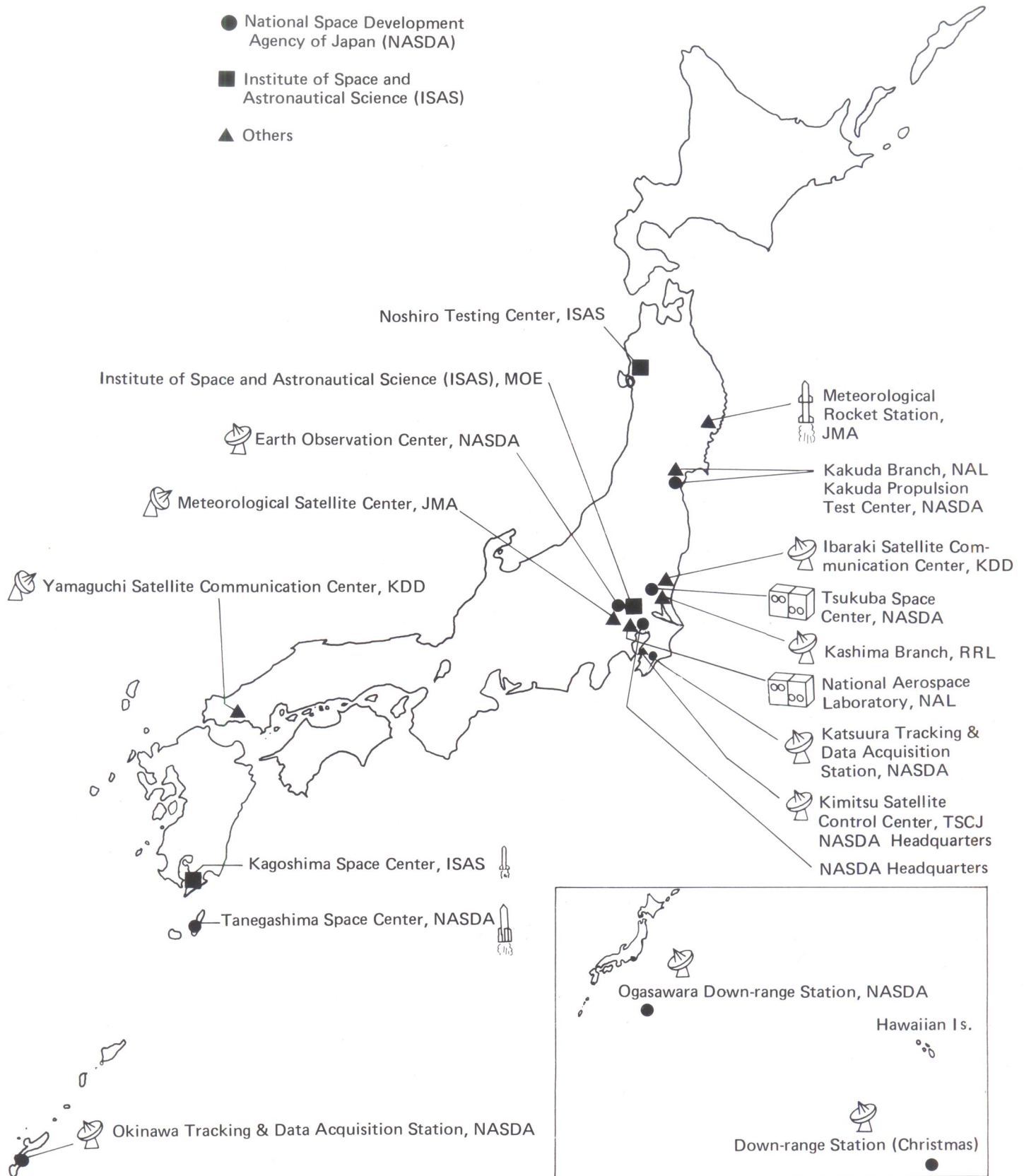
- 2-4-9, Higashi-Shinbashi, Minato-ku, Tokyo
- 2. Koji Kobayashi
- 3. Telephone: (03) 432-1485
- 4. JSUP Engages in the Following Activities Concerning the Utilization of Space Environment.
 - (1) Testing, Research and Development.
 - (2) Leasing-Out of Experimental Equipment.
 - (3) Collection, Analysis, and Provision of Information.
 - (4) Public Relations.
- 5. Masatada Koike

Addresses of Organizations Related to Space Development

- Science and Technology Agency
2-2-1 Kasumigaseki, Chiyoda-ku, Tokyo 100
Telephone: (03) 581-5271
- National Aerospace Laboratory
1-880 Jindaiji, Chofu, Tokyo 182
Telephone: (0422) 47-5911
- National Police Agency
2-1-2 Kasumigaseki, Chiyoda-ku, Tokyo 100
Telephone: (03) 581-0141
- Ministry of Education
3-2-2 Kasumigaseki, Chiyoda-ku, Tokyo 100
Telephone: (03) 581-4211
- Institute of Space and Astronautical Science
4-6-1 Komaba, Meguro-ku, Tokyo 153
Telephone: (03) 467-111
- Kagoshima Space Center
Uchinoura, Kimotsuki-gun, Kagoshima Pref. 893-14
Telephone: (099467) 2211
- Ministry of Agriculture, Forestry and Fisheries
1-2-1 Kasumigaseki, Chiyoda-ku, Tokyo 100
Telephone: (03) 502-8111
- Ministry of International Trade and Industry
1-3-1 Kasumigaseki, Chiyoda-ku, Tokyo 100
Telephone: (03) 501-1511
- Mechanical Engineering Laboratory
Agency of Industrial Science and Technology
1-2 Namiki, Sakura-mura, Niihari-gun, Ibaraki Pref. 305
Telephone: (0298) 54-2501
- Electrotechnical Laboratory
Agency of Industrial Science and Technology
1-1-4 Umezono, Sakura-mura, Niihari-gun, Ibaraki Pref. 305
Telephone: (0298) 54-5023
- Ministry of Transport
2-1-3 Kasumigaseki, Chiyoda-ku, Tokyo 100
Telephone: (03) 580-3111
- Electronic Navigation Laboratory
6-38-1 Shinkawa, Mitaka, Tokyo 181
Telephone: (0422) 45-5171
- Maritime Safety Agency
5-3-1 Tsukiji, Chuo-ku, Tokyo 104
Telephone: (03) 541-3811
- Meteorological Agency
1-3-4 Otemachi, Chiyoda-ku, Tokyo 100
Telephone: (03) 212-8341
- Meteorological Research Institute
1-1 Nagamine, Yatabe, Tsukuba-Gun, Ibaraki Pref. 305
Telephone: (0298) 51-7111
- Meteorological Satellite Center
3-235 Nakakiyoto, Kiyose, Tokyo 180-04
Telephone: (0424) 93-1111
- Ministry of Posts and Telecommunications
1-3-2 Kasumigaseki, Chiyoda-ku, Tokyo 100
Telephone: (03) 504-4798
- Radio Research Laboratories
4-2-1 Nukii-Kitamachi, Koganei, Tokyo 184
Telephone: (0423) 21-1211
- Ministry of Construction
2-1-3 Kasumigaseki, Chiyoda-ku, Tokyo 100
Telephone: (03) 580-4311
- Geographical Survey Institute
1 Hokugo, Yatabe, Tsukuba-gun, Ibaraki Pref. 300-21
Telephone: (0298) 54-1111
- Fire Defense Agency
Ministry of Home Affairs
2-1-2 Kasumigaseki, Chiyoda-ku, Tokyo 100
Telephone: (03) 581-5311
- National Space Development Agency of Japan (NASDA)
World Trade Center Bldg., 2-4-1 Hamamatsucho, Minato-ku, Tokyo 105
Telephone: (03) 435-6111
- Tanegashima Space Center
Minami-Tanegashima, Kumage-gun, Kagoshima Pref. 891-37
Telephone: (09972) 6-1240
- Tsukuba Space Center
2-1-1 Sengen, Sakuramura, Niihari-gun, Ibaraki Pref. 305
Telephone: (0298) 51-2271
- Telecommunications Satellite Corporation of Japan
Kyosei Bldg., 2-12-18 Shiba-Daimon, Minato-ku, Tokyo 105
Telephone: (03) 432-2801
- Japan Space Utilization Promotion Center (JSUP)
2-4-9, Higashi-Shinbashi, Minato-ku, Tokyo
Telephone: (03) 432-1485
- Federation of Economic Organizations (KEIDANREN)
KEIDANREN Bldg., 1-9-4 Otemachi, Chiyoda-ku, Tokyo 100
Telephone: (03) 279-1411
- Nippon Telegraph & Telephone Public Corporation (NTT)
1-1-6 Uchisaiwaicho, Chiyoda-ku, Tokyo 100
Telephone: (03) 509-5111
- Nippon Hoso Kyokai
(Japan Broadcasting Corporation) (NHK)
2-2-1 Jinna, Shibuya-ku, Tokyo 150
Telephone: (03) 465-1111
- Kokusai Denshin Denwa Co., Ltd. (KDD)
2-3-2, Nishishinjuku, Shinjuku-ku, Tokyo 100
Telephone: (03) 347-6933
- Remote Sensing Technology Center (RESTEC)
7F Uni Roppongi Bldg., 7-15-17 Roppongi, Minato-ku, Tokyo 106
Telephone: (03) 403-1761

Location of Major Facilities

- National Space Development Agency of Japan (NASDA)
- Institute of Space and Astronautical Science (ISAS)
- ▲ Others



SPACE IN JAPAN
1986-87

Prepared under the editorial supervision of
Research Coordination Bureau,
Science and Technology Agency

Published by
KEIDANREN (Federation of Economic Organizations)